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ORIGINAL ARTICLES

CLINICAL CONTRASTED WITH INSURANCE OPINION OF AN INSURANCE APPLICANT*

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The word clinical means, in its restricted sense, the observance of the symptoms and course of a disease as distinguished from the anatomical changes. The clinician or practicing physician, differing from the pathologist or laboratory man, does much more than this, for he sees his patients at the home or in an office, a dispensary or a hospital. He obtains the previous health history, usually from a willing and helpful patient; he makes whatever physical examinations are necessary or that the facilities at hand afford; he notes the appearance and records the anatomical or physical changes found; he adds the results of the available indicated laboratory tests; he sees and re-examines his patients more than once, often repeatedly; he refers to his text books and journals and frequently obtains consultation; he applies treatment of various kinds, watching the effects; he makes his diagnosis and prognosis and these, with the treatment, as we all know, may change from time to time for various and justifiable reasons.

The prognosis is of two degrees or kinds, immediate and remote. Will the patient recover from the present attack completely, or will his recovery be incomplete with more or less permanent ill-effects upon his health? Will he have a slow or delayed, but ultimate full recovery? Here again the clinician has the advantage of repeated observations or examinations and almost unlimited time in which to reach a conclusion and give his opinion. During all this it is to be remembered that the patient is doing all he can to aid his physician.

The insurance examiners—and the best of these are found in the ranks of good clinicians in the everyday practice of medicine and surgery—meet an entirely different situation. We will all admit that the ideal place for an insurance examination is at the examiner's office, but this cannot always be arranged and it is needless to recount here the reasons why.

Thus many times the examination has to be made in noisy, unsuitable surroundings. There is no privacy, he is unable to remove sufficient clothing to permit of proper chest or abdominal examinations and he cannot verify the weight. There is insufficient time, because the applicant is too busy or has not been sufficiently sold by the soliciting agent.

Additional to these difficulties, though many applicants tell all they know about their previous health history or their present signs or symptoms, thereby aiding the medical examiner to furnish a pen picture, together with his own conclusions, there are, unfortunately, all too large a number who use their intelligence to the limit to prevent the examiner from learning about any previous conditions that might have unfavorable effects upon their obtaining the insurance requested, and numerous others in some manner have discovered methods of temporarily relieving or causing to disappear signs and symptoms that might give rise to an unfavorable opinion in their case.

We can, therefore, all of us, readily see that the insurance examiner, in the short time he is allowed in which to make his examination—often in inconvenient and unsuitable surroundings and frequently without the aid, if not with the direct antagonism, of the applicant—has a much more difficult problem than the clinician to obtain and set down in connected form the information for a case history. Those supposedly healthy or well are probably the only ones who unreservedly submit themselves for insurance examinations.

*Read at Fourth Annual Clinic Week, Ramsey County Medical Society, St. Paul, January, 1924.

The expert or well-trained clinical diagnostician will find early or prodromal signs that might escape the general practitioner; but the latter, who has been endowed with good general common-sense and has trained his powers of observation along physical examination lines, will usually recognize significant changes even in their incipiency.

Inspection or observation is one of the most essential features in the training of both clinician and insurance examiner, and the best results are obtained by those who have best developed this faculty.

Personal knowledge of the applicant or his family and his living conditions should aid the examiner in his report and, be it said to his credit, the honest physician responds to the trust placed in him by the company for whom he is rendering a report.

Honoring, as I do, and as any reasonable individual must, the sacredness of the trust imposed upon a physician in his dealings with a patient, is there not a still more sacred duty imposed upon the profession when the question of the greater good to the many opposes that of the individual? An applicant for insurance, be he examined by his personal physician, an acquaintance or a stranger, by that application agrees to give such information as he is able, and when he states that he has been under the care of or received advice or treatment from a physician, he, by that admission, has released that physician from his personal obligation. Therefore, I would prefer in the average case to have the examination of the average physician who knows the applicant to that of the higher-trained man to whom the applicant and his personal history are unknown. The questionable applicant (probably one in four) who may try to conceal his history or physical abnormalities, can undoubtedly be best examined by the best trained physician so far as physical examination and diagnostic conclusions are concerned.

Insurance medicine is founded upon case histories (personal and family records), physique (height, weight and trunk measurements, with changes in weight), age, occupation, race, sex, marital state and physical and laboratory findings. The Home Office Medical Department must take these records, study them carefully and place the applicant in a group made up of as nearly similar individuals as they can, and from the results obtained by insuring previous individuals in such a group estimate the probable longevity or give the insurance (remote) prognosis or the effect upon the length of life.

Briefly, we might state that insurance premiums are based upon actuarial calculations as to the amount of money (premiums) that must be collected during the estimated length of life of the individual to enable the company to pay the expenses incidental to obtaining the application, making the examination, issuing the policy, supervising the business and paying the claim. Based upon normal death rates for various ages, the deaths per year are calculated for groups of a thousand and confirmed by many thousands. Some members of these groups die early, or before the expected period, and some outlive that time, hence the average. Variations from the average, due to variations from normal health histories or physical findings, make necessary various types of policies differing from the regular or standard policy, and in those that cannot be classified or that cannot be covered by a reasonable rating a rejection must be made. The group basis, therefore, must supplant the individual in insurance prognosis and thus another difference arises from the clinical viewpoint. The mathematical accuracy of the study that has been made of life insurance records has enabled the companies to offer, during the last few years, insurance to many an individual for whom no adequate rate had been made and whose insurance would, therefore, have been at the expense of the standard risk, or he would have been declined.

We find that many of the differences that exist, start from the practical everyday experience of the practitioner with his patient as contrasted with what the future has in store for that patient, based upon life insurance records of their experience with the large mass of people the companies have on their books.

Occupation is healthy or unhealthy in the minds of the average man as he sees the effects upon his acquaintances or neighbors or as he may occasionally read a newspaper or magazine article. Quite general, but indefinite, ideas prevail about the increase above the normal average of a community of impairments or deaths that are due to the iron and steel mills, mining (coal and metal), lumbering, railroading in its various branches, textile mills, hat factories, duties of peace officers, or hundreds of other occupations. All these have had their records kept and estimations have been made show-

ing how they compare with the average death rate, and insurance is granted accordingly—not upon the individual case.

The medical knowledge of the field examiner is needed to recognize and record any changes from the normal that he detects and the effects of these changes must be considered with various other features in the insurance summation.

Consideration of the habits of an individual in insurance was ordinarily limited to the use of alcohol of the ethyl chemical type and the effects of varying amounts used intermittently or daily, slightly or to intoxication, had been quite well determined for insurance purposes if not from the ordinary physiological or pathological standpoints. Agreeing that the differences in individual resistance are probably shown as well in the effects of alcoholic beverages as of anything else, still the mass results from histories recorded cause the classification into insurable or not insurable, and the exceptions cannot be made that the clinical observer thinks should be. The effects of modern intoxicating liquors are better known as yet from individual instances, but present indications are for worse effects than formerly.

Family history plays an important part in life insurance. No matter how much we may read or think pro or con on the subject of heredity, each of us sees every day children who show enough of the ancestral characteristics to make us believe there must be inherited disease tendencies as well as mental and physical traits. Thus the histories of apoplexy, paralysis, circulatory diseases, diabetes, tuberculosis, early deaths and many other points in the family history all call for care, either because of these records alone or in connection with personal health history or the physical findings.

Personal health histories have their value increased by family histories, age, sex, occupation, physique and the examiner's physical findings.

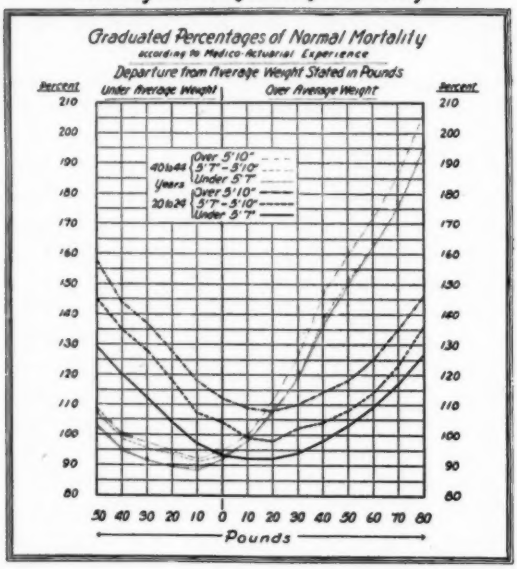
We are all aware of the possibilities of serious developments after slight superficial injuries, mild colds, digestive upsets, etc., and while the probable effects are usually belittled to the average patient the true physician also cautions his patient to take common-sense care of himself until the mild ailment has disappeared as most of them do. Life insurance cannot disregard the presence of these abnormalities because of the occasional case that goes wrong; hence, as a rule, final action is deferred until receipt of an examiner's statement that full recovery has resulted, or approval may be taken requiring a favorable health certificate before the policy can be delivered.

Statements of present conditions should not be vague or diffuse, but must be definite enough to enable the medical reader of the case history to formulate a legitimate opinion based upon ordinary medical practice, supplemented by his training in the use of insurance standards. Such a statement as "cold for the last two weeks" may mean nothing of any moment to the examiner and it may mean any of numerous possibilities to the home office reviewer. Serious illnesses or surgical conditions present, or histories of such past troubles, call for rejection, postponement, or an action depending upon their character or severity and the prognosis of the immediate and ultimate outcome. This statement from an examiner of large experience: "Cystoscopy showing irritation of one kidney? Cured by large quantities of water," may have been sufficient for him with his other knowledge of the case, but we were not furnished dates, symptoms, duration of treatment, microscopic urinalysis, etc., and, therefore, had insufficient information to form an opinion on the future of the individual. A report received in December, 1923, of "Gallstones and drainage in 1921, prompt recovery and all right since," would do for a medical or surgical opinion for the immediate future, but clinical and insurance experience shows that the probability of recurrence of gall stones or gall bladder troubles is based upon the time since symptoms or operation. What month in 1921 did this operation occur? If in January then practically three years had elapsed by December, 1923, but if in December, 1921, only two years had passed. The clinical examiner found the case all right but he failed to complete the history for use of his medical director. Such instances could be multiplied indefinitely but they would only serve to emphasize the insurance need of enough facts to give a proper pen picture of the applicant, thereby allowing legitimate application of medical life insurance experience in the proper placing of the individual case.

The reported physique of an applicant is one of the chief troubles of the home office, and yet it should be one of the easiest parts of an examiner's report to record the figures so that there could be no doubt. Weight in ordinary street clothes, minus overcoat, height in ordinary street shoes, and chest and waist measurements under the vest should be

readily and accurately obtained. The only figures about which there might be any uncertainty are those for weight, as scales are not always at hand.

Mortality According to Height and Weight



Here, if there is any doubt in the examiner's mind, or if the case is materially below or above average weight, special comment should always be made to show that the examiner has noted the abnormal weight.

Physicians, because of their professional training, are quite positive usually of the results of their personal observations. All will admit that overweight is an impairment, that abdominal girth greater than expanded chest is a handicap to long life, that soft or flabby flesh is not a good sign, yet we each know of so many persons of these types that live to old age that we are prone to disregard them in practice and only strive in a half-hearted way to instruct these persons in improving their physique, unless some direct complaint is traced to this as a cause. Height and weight taken in connection with age have probably more definite data than any other phase of insurance selection, hence there is here a sound foundation for action. Year by year of age and almost pound by pound of weight the records have mounted so that the classification can be made with great exactness.

The accurate verified height and weight is, therefore, most important in any case more than 20 per cent over or under the average for age. Group classes must be formed and even 1 or 2 pounds may mean the difference between standard or rated insurance or a rejection.

The American Experience Table of Mortality gives, for a given age, the number of deaths that are expected per 1,000 during the next year. Any increase over this expected number means an unestimated loss to the insurance company, unless their policy has been issued to cover such an increase.

The effect of age upon height and weight can be illustrated by taking the two groups of 20 to 24 years and 40 to 44 years, as shown in the chart.

Height makes a difference, the greater mortality rate being shown by the taller persons. Those under 5 ft. 7 in. show a lower and those over 5 ft. 10 in. a higher mortality. A brief glance at the table below should convince anyone that insurance must take account of age, height and weight in the calculation of a premium rate. Mortality percentage as compared with 100 per cent is calculated.

Very frequently reports are received that the applicant has occasional digestive (gastric, intestinal or biliary) disturbances, but that they do not keep him from his occupation for more than a day or two; there may be a rheumatic history without definite symptoms or the statement that it was articular in type; attacks of disturbed breathing upon slight exertion; of rapid heart action or palpitation; of feeling tired after ordinary or regular daily routine; slight loss of weight without climatic or

Height group 5 ft. 7 in. to 5 ft. 10 in.

	Underweight					*Weight Standard*	*Overweight*							
Pounds	50	40	30	20	10	0	10	20	30	40	50	60	70	80
	%	%	%	%	%	%	%	%	%	%	%	%	%	%
Ages 20-24	145	135	128	118	107	104	99	98	102	104	108	114	123	136
30-34	125	113	109	103	98	97	96	100	111	119	127	136	146	161
40-44	107	99	96	94	92	94	99	109	121	140	152	164	177	197
50-54	94	89	88	87	88	95	102	113	120	132	144	157	169	186

occupational cause; pleurisy may be mentioned but no particulars given; suspicious of specific infection with history very indefinite, etc. Such cases are very often properly rated by the examiner as first-class so far as his findings at the time of examination are concerned and he frequently so informs the applicant and many times the interested agent; but, lo and behold, a request comes from the home office for more information or, in some cases, the application is declined or a policy offered with an increased premium.

The insurance case requires definite records of parts of the body affected, primary and secondary, the date or dates of attacks, duration of illness or period in bed or house and the following stage of convalescence, severity of symptoms, complications present and degree of recovery. Acute attacks, from which recovery is usually prompt and complete, are much more preferable in life insurance work to indefinite or chronic indispositions, whose histories are often incomplete but whose causes are hard to determine and are frequently of serious systemic character. These indefinite recurring mild indispositions are warning signs in insurance selection and should be in clinical or practical medicine, especially after age 45 to 50 has been attained. Here lies the field of preventive medicine and the physician can do much for the health of his local community, his state and his nation, by preaching and practicing regular physical examination of his patients, to be followed by sensible regulations of work, diet, rest or recreation for those showing indications of feeling the strains of life, and the recommendation of medical or surgical treatment for those needing the same. Most physicians would find their incomes as large as at present, but it would come from a more satisfied clientele for they would have been kept well instead of being treated after becoming ill. In our opinion, the periodical health examinations being offered by insurance companies to their policyholders—as in the Prudential Longevity Service—can be made most effective by working with the policyholder's own physician, for thus he is kept in touch with the doctor, who has more personal interest and who is able to extend advice and supervise treatment that will benefit the individual the most.

Some of those present will recall the results of a study made a few years ago of the Mayo Clinic digestive ulcer cases. These showed better results for duodenal than gastric operations after the second year and until the sixth year, when the mortality was found to be practically the same as for persons of the same ages without any such operations. We are receiving many applications from ulcer cases (medical and surgical) and they are almost all reported in first class condition of health, but we cannot insure them at regular rates unless in our opinion sufficient time has elapsed. The number of these cases we have taken during the last three years indicates that after five to ten years' experience we can tell more of the remote prognosis in the average case than we are in a position to do now. This information will be of service to the general physician for many of the cases being insured were treated by him and not in our large surgical hospitals or centers.

Syphilitic infections are so prompt in the disappearance of cardinal secondaries under modern treatment that more histories of doubtful character are received than formerly, but advantage must be taken of suspicious cases, for past records show a large mortality in such cases presumably because treatment was discontinued too soon. Treatment with salvarsan or its similars, followed by mercurials, is considered the legitimate method and a Wassermann check is advisable from time to time, especially if any obscure train of symptoms arises. Such a course of treatment, with negative Wassermann and the patient in good general health, causes the physician to advise his patient that his disease is arrested or cured and that with due care he can engage in a regular or active business life. Insurance experience shows that a negative Wassermann means no sign of active syphilis was found in the blood specimen examined and any number of negative Wassermanns, in our opinion, prove that the patient has received and reacted to proper treatment, but any company that accepts such cases at regular rates will pay an undue number of early claims. Syphilis cases properly treated are insurable but not at regular rates.

Diabetes is a condition that causes the clinician and insurance office much trouble. A disease which caused 17,000 deaths in the United States, as this did in 1922, and which is reported as increasing, must have many victims in the incipient and active stages. Probably as much has been written about this disease as any other in the medical and lay press during the last year or two. The physician has here, by the various kinds of treatment, especially diet or starvation and now by the use of

iletin (insulin) and the education of the public, one of the best conditions in which he can improve his patients' health, but experience proves that the vigil must be closely maintained. Insurance experience shows that once a diabetic always a diabetic, and our problem is to determine whether the applicant whose urine shows glucose or whose history shows a former glycosuria or a suspicious train of symptoms, is merely an individual of low sugar tolerance, a pre or potential diabetic, or an actual active case. Methods of urinalysis and other means of examination are becoming so perfected that efficient protection is being offered insurance companies and the true diabetic is rarely considered an insurable risk at standard rates.

Urinalysis is one of the laboratory methods in which medical students have been quite thoroughly drilled and if, as in many instances, this instruction has been followed by a hospital interneship the training has been such that physicians should make dependable qualitative examinations of urine specimens as they are secured from patients or from life insurance cases.

Why is it that so many insurance specimens, when checked in a local or Home Office laboratory, give different specific gravities or albumin or sugar reactions than those reported by the field examiners? Various theories have been advanced and I suppose mine is as good as another's. I believe the average practitioner is able to make a reliable qualitative urinalysis, but I know many of them do not as insurance examiners, and I think haste or carelessness is the reason for this. Fifteen years close association with Professor Walter S. Haines, one of the best teachers of medical students this country ever had, gave me an insight into methods of instruction in our better medical schools. Experience the last fifteen years with practitioners as insurance examiners and for over thirty years with clinicians has shown how rapidly the average physician falls away from the laboratory methods and technique he was taught in school. Many of his simpler cases he carries along without any laboratory tests and with the others he has become quite dependent upon hospitals, laboratories or public health departments.

Many of the insurance companies have established a central or Home Office laboratory for the examination of specimens of urine from their questionable cases. Thus they have a uniform method or standard by which these cases are judged and all are treated alike. Our own laboratory so handled 40,000 specimens in 1923, not because we doubted the ability of our examiners but in order that we might take advantage of one standard instead of several thousand, as would have been the case had these examinations been made by our field examiners.

The clinician will always be necessary in the healing of the sick and more and more in the prevention of sickness, but if he has received nothing else from life insurance medicine he has been taught the value of blood pressure and the methods of taking it. Life insurance has furnished the only large collection of blood pressure reports on healthy men; it has shown that blood pressure increases with age or with weight, and that weight increases with age, but that the most increase in blood pressure comes after the age of forty. The blood pressure is affected by methods of living, eating and the use of alcohol, for the average dropped during the restricted diet of the late war and began to rise again in 1920. The records show that both systolic and diastolic rise with age and weight, but the systolic rise is greater than the diastolic, hence the pulse pressure also rises. Systolic readings above 140 mm. or diastolic above 100 mm. or pulse pressures below 30 mm. or above 50 mm. should be considered as danger signals in life insurance. Insurance records are reliable for people in average good health and they are taken with the applicants in a sitting position, usually during the course of their regular daily routine of living.

Addis (Arch. Int. Med. 1922) claims there is a striking difference in blood pressure taken before rising in the morning and after the individual has been up and around or later in the day and that the normal average of daytime measurements cannot be taken as a standard for patients who are standing or sitting up or exercising.

The insurance averages are made from records taken during the time the people are under the strain that tells and, therefore, they are the fairest to use as a basis for prognosis. Food, exercise and excitement all affect blood pressure, but not enough to interfere with life insurance for a healthy risk. If the observation is too high and remains so after eliminating any nervousness over the examination it will rarely come down without treatment.

Mr. Arthur Hunter, Chief Actuary of the New York Life Insurance Company, at the 1923 meet-

ing of the Association of Life Insurance Presidents, stated that the higher the blood pressure above the average the greater the mortality above the normal, and that persons with a distinctly high pressure are prone to develop diseases of the heart, blood vessels and kidneys, the mortality from heart disease, apoplexy and Bright's disease being very high among them. He further concludes from his observations and calculations that "Blood pressure is the same throughout the world under like conditions." It is principally affected by the kind of diet and the quantity of food, simplicity of living and freedom from nervous or physical strains having a beneficial effect. He believes that a reduction in blood pressure of Americans in the United States would result in greater longevity, that a better adjusted diet, containing less animal food, would result in a lower blood pressure and in greater longevity with an equal ability to carry on their various occupations.

I know of nothing better to close this brief and all too incomplete discussion than to quote the words of one of the leading Medical Directors of this country, Dr. Brandreth Symonds, Chief Medical Director of the Mutual Life Insurance Company of New York, who concluded his paper on blood pressure at the Thirty-third Annual Meeting of the Association of Life Insurance Medical Directors in 1922, as follows:

"Probably life insurance and general medicine will never regard blood pressure in the same light. Life insurance sees only people who are healthy or at least think they are. Even the highest pressure of fat elderly people is below 140 mm. on the average, if they are acceptable for life insurance. This also means that practically as many are below 140 mm. as above and we have seen that of those above 140 mm. nearly all of them are below 150 mm.

"General medicine on the other hand sees those who feel that they are sick. If their illness is due to blood pressure, it is usually high, frequently as high as 200 mm. or more. General medicine knows that these high pressures will come down to 170 mm. or 180 mm. by appropriate treatment and many of them live for years. There are examples among our own associates. But medicine does not realize that a small increase in the number of deaths per year means a great difference to life insurance. At age 50 we only expect 14 to die in the following year out of 1,000 living and we call that 100 per cent mortality. If 28 die, our mortality jumps up to 200 per cent. At age 60, if the number of deaths among 1,000 living increases from 26.69 to 40.04 the mortality increases to 150 per cent. If a practitioner should see 1,000 patients with high blood pressure at age 60 and bet with himself that 974 would survive the year and only 960 did survive he would not feel downcast; in fact, he would probably point to the record with pride and boast of his ability in prognosis. But life insurance would have to tell him that his mortality was 150 per cent in that group and a medical director who never made a better guess than that would not keep his position for long. General medicine would look complacently at the living, but life insurance would ruefully regard the dead, for forty claims would have to be paid instead of the twenty-six expected."

TULAREMIA (?) IN NEW YORK STATE

The appearance of a number of diseased wild rabbits in a western county of the State has been brought to the attention of the Division of Laboratories and Research. It was thought that there might be an outbreak of tularemia among these animals and steps were immediately taken by a local laboratory in that vicinity to obtain information concerning the examination for *bacterium tularense.*

The disease has been studied intensively in Utah, where it became quite prevalent among the farmers, incapacitating those infected for two or three months, frequently at the harvest season. Recently workers of the Hygienic Laboratory in Washington reported the finding of cases of the disease in infected rabbits in California, Utah, Wyoming, Idaho, Colorado, southern Indiana and Ohio, Tennessee, North Carolina and Washington, D. C. So far as is now known, this disease is confined to the United States. In New York State no report of cases suspected of being tularemia has been found. More is being heard of this disease, however, from other parts of the country, and it is important to be on the alert to prevent its introduction and spread in this State—especially among jack-rabbits and squirrels. The etiological agent may be transmitted from these infected animals to man by handling and dissecting such animals or by the bite of an insect. Francis, who has made an extensive study of the disease, reports that blood-sucking flies, stable flies, rabbit lice, mice lice, squirrel fleas and bedbugs can carry the *bacterium tularense* from animal to animal.

The clinical picture of seven cases of tularemia in Utah was summarized by Lake and Francis of the United States Public Health Service as follows:

"All seven had a sudden onset of illness with fever, closely following an insect bite, which became the site of suppuration and which was accompanied by a consequent unilateral suppurative lymphadenitis of the glands, which immediately drained the bitten area. The constitutional disturbance was severe, as indicated by febrile attacks which lasted from three to six weeks and which were followed by slow convalescence. *Bacterium tularense* was isolated from the suppurating lymph glands in five cases and from the blood in two. Serological tests were positive for complement fixation and agglutination, using antigens composed of cultures of *bacterium tularense.*"

The extremely infectious nature of the disease has been demonstrated by the fact that six laboratory men who were closely connected with the investigation of tularemia contracted it. This led to the adoption of a regulation in the Hygienic Laboratory in Washington which prevents cultures of *bacterium tularense* being sent to any institution. —*New York Health News, Vol. 1, No. 7.*

MEDICAL EXAMINERS' RELATIONSHIP TO THE COMPANY AND ITS BEARING ON MEDICAL SELECTION*

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The practitioner frequently is of the opinion that the physician who devotes his entire time to the medical work of a life insurance company occupies an isolated position so far as contact with fellow members of his profession and opportunity to orient himself with the progress in medicine is concerned. He ventures his opinion without an understanding of the medical director's true environment.

My work during the past twenty years has afforded me the utmost satisfaction in the opportunity which I have had both for personal association and correspondence with not only examiners representing my company during that period but the contact into which I have been brought in various ways with the pure clinician or advanced research worker in medicine. I accepted your Chairman's very kind invitation because of the opportunity which it will afford me to enter into intimate contact with the medical representatives of my company in this territory and the opportunity which it will afford me to meet the scientific practitioners of this locality in general rather than in the hope of being able to say anything to you which might be of very great interest.

Occasionally one receives the statement from an examiner with regard to a particular risk which gives the impression that the examiner considers himself the only factor in selection, and because he considers the impairment in question either of very great moment or of no importance—his opinion usually depending upon his personal experience with a varied number of cases—that the company in its action should depend absolutely on his expression of opinion. It should always depend in a very large and I may say major measure upon his opinion with regard to the insurability of an applicant, but there are certain other features which are to be taken into consideration in order to attain a proper balance in action.

The insurance business is based on the law of average. The exposure in the experience of any company is vastly greater than can be that of any clinician and consequently must be the guide in evaluating any favorable or unfavorable features rather than the experience of an individual practice. Upon this in my opinion is based the very considerable difference between so-called life insurance medical viewpoint and the clinical viewpoint.

Hardly a day passes but I have occasion to wish that some examiner or attending physician who informs an applicant or the agent representing that applicant that he is of the opinion the applicant will attain his full life term notwithstanding some granted physical impairment, which throws the applicant into a class the experience of which I know will be decidedly unfavorable, could have had an opportunity to read and digest this statement of Dr. Symonds.

Nevertheless medical examiners are the keystone of the arch in selection by life insurance companies. Other factors of selection work either for or against the success of a company which in its final analysis means the protection of the savings and investment which the individual policyholder has intrusted to the company. Selection by the medical examiner in making accurate physical examinations, solicitation of accurate personal and family histories and the expression of opinion as to the viability of the risk as a whole operate always to the success of a company provided the examiner is competent and conscientious and surely no larger proportion of any group of men is so constituted than is the case in a group of physicians acting as examiners for well operated life insurance companies.

Selection against the company consists first upon the so-termed self-selection on the part of an applicant. Occasionally it is with definite evasion and definite intent to defraud. More frequently it occurs even subconsciously on the part of one who does not feel up to par, who assigns no reason for his untoward yet minor symptoms except that he perhaps attributes to increased age more importance in the change in his feeling of well-being than is its due, but just naturally feels that he had better get as much coverage as possible while the opportunity is still present. Selection on the part of the agent may operate either for us or against the interest of a company and its policyholders, depending upon whether an agent is loyal to the welfare of his company or on the other hand his interest in his present commission entirely overshadows not only his interest in the welfare of the company and

*Read at the Fourth Annual Clinic Week of the Ramsey County Medical Society, St. Paul, January, 1924.

of the policyholders which he has been instrumental in placing on its books but his future or permanent standing with the company as well.

While a home office has an additional aid to selection in its tabulated experience, the features previously referred to constitute selection so far as the field is concerned.

The field examiner is not concerned with how risks shall be classified or acted upon at the home office. He is depended upon to present a true picture of the applicant's physical condition as found upon careful examination and to obtain an exact record of the applicant's personal and family history. With this picture the home office is able to properly classify the risks presented to it. The field examiner is, consequently, not in a position to assure an applicant or the agent as to what will be the company's action on a given case.

In making examinations he is expected to display tact and ability to meet the applicant on his own ground, so to speak, so that he may be at ease. This is not solely for the purpose of being agreeable to the applicant but also because one when at ease is most apt to give a fair statement.

An apparent lack of frankness on the part of the applicant may lead to the necessity of an examiner availing himself of decidedly searching questions, put from various different angles, in order to develop the truth to which the company is entitled before acting.

An examiner is not only justified in going beyond the questions on the blank, but is expected to do so provided the course of the examination develops anything which arouses his suspicion, and such action is not criticisable.

Examinations conducted in a too routine manner are not looked upon with favor. Short of drawing on the imagination, which I am satisfied good examiners never do, an examiner cannot be justly criticised for thoroughness in the matter of examinations.

So-called borderline cases receive favorable consideration at the hands of the home office medical officers when examined most thoroughly and conscientiously and to an extent which would not be possible if we accepted superficial examinations.

Examiners are selected and employed on the basis of their professional qualifications. Their adaptability is important but secondary. A competent diagnostician even though he be a crank in his relations with men is preferable to a weakling in medicine even though the latter be as full of sunshine as a day in June. A combination of competency and sunshine is of course much to be desired when obtainable and that agent so situated that he has an opportunity of working with such a counsel of perfection is indeed fortunate. Perfection, however, is difficult of attainment.

Although the field examiner cannot render a decision as to the proper class in which an applicant should be placed, the home office action in this respect is based, so far as the medical aspect is concerned, upon the findings of the examiner so that one is entirely correct in stating that he is the most important factor in home office selection and the most important single contributing factor towards a satisfactory mortality upon which the success of a company and the protection of its policyholders depend.

It depends upon the home office medical department to maintain in the field its medical organization at the highest possible standard, appointing only examiners who are competent diagnosticians, painstaking and accurate and who will render true and accurate reports without fear or favor. Such a corps of field examiners can be maintained only in case its members can believe that they will be supported by the home office and its field representatives when they render good mdical service in its most essential element, that is, assistance in medical selection.

The very necessary sense of loyalty to the company cannot be felt by its examiners unless they are able to feel that they have the support of the company when they conscientiously perform their duties in connection with medical selection.

If an examiner feels that officers responsible for the appointment and continuance of examiners attach undue weight to complaints made against them which are not true in fact but which consist of an enlargement of trivial matters made because a solicitor has taken exception to the company's action and holds the examiner responsible when he is only responsible in so far as he has done his duty in reporting the facts as determined, that examiner will lose his sense of loyalty and either decline to serve the company further as inconsistent with his ideals if he is a man of honor, or, if his ideals are not high, become less thorough and competent—either of which results is deplorable.

An examiner whose vision is broad can be of assistance to the selling force in many ways with-

out lessening in any way his value in the field in which he is essential, that of selection. However, he must never let his desire to accommodate interfere in any degree whatever with the really vital service for which he is employed, that of making competent examinations.

An examiner should never have cause to believe that continuance of his services is dependent upon any other than loyal and intelligent service.

We are all human, even we doctors, but I sometimes think that we should be more human than others because of our opportunity to observe the frailties of human nature and consequently should be less inclined to take exception to any unfairness. Still it is the natural inclination of the human mind to react to unjustified accusations by an indifference to the rights of the accusers.

I am satisfied that the agent who meets an examiner half way in the matter of the many accommodations which may enter into their relations aside from the matter of pure medical selection attains a much greater success in the handling of his business and enjoys his life of freedom from friction to a much greater extent than does the agent who looks upon an examiner as a necessary evil whose functions are to be considered on a low plane and to be overridden when possible. Suspicion breeds suspicion. Examiners and agents succeed in their relations when they meet on the ground of gentleman to gentleman.

Medical selection in so far as it refers to the physical condition of the applicant at the time of examination affects the mortality results for a period of perhaps five to six years from the date of issue, as by the end of that time a group of selected lives will have reached about the same physical condition as a group of applicants. Medical selection may influence the mortality to a certain extent for a greater period by giving due consideration to family and personal history as these are matters of history already sustained and with a consequently fixed value instead of being matters of possible future development as are physical impairments which may be found upon examination.

The work of the medical department begins with the examination of the applicant by the examiner in the field, which constitutes the first consideration of the insurability of the applicant by the company after solicitation on the part of the agent. The field examiner is depended upon to examine the applicant thoroughly, to report to the home office a correct picture of his physical condition and to obtain complete and accurate information as to personal and family history. The examiner must be a competent physician gifted with the power of keen observation and must be trusted to observe any material conditions as regards surroundings, the results of improper habits and any factors which may bear upon the insurability of the applicant.

In many companies, including my own, the medical examiner's report of examination is forwarded to the home office direct by the examiner without passing through the hands of any agency representative. This plan is followed for the reason that the physical condition and personal history of an individual is a confidential matter, that knowing this he is more willing to enter into detail with the examiner with regard to personal and family history and that the examiner may not be subjected to criticism or pressure on the part of the interested agent because of findings obtained by the examiner since the agent is not made aware of the findings. Better work is consequently done by the examiners, and examiners have a very deep appreciation of the correct attitude of a company which deals with the matter in this way. This plan also lessens materially the amount of correspondence between the agent and the home office as regards the reason for the company's action in a given case.

An important feature in examiners' relationship to a company is its selection of examiners who shall represent the company in their communities, make satisfactory examinations, be both businesslike and professional in their relations with agents and applicants and at the same time always remember that their duty to the company requires that they report all material information to the company. In order to secure loyalty to the company and interested services on the part of examiners it is always necessary to sift to the bottom all field complaints regarding examiners so as to determine whether or not they are justified by the facts or dependent upon personal feeling upon the part of agents or applicants because of a necessary unfavorable action taken by the company on business previously submitted or because of personal dislike or differences between the examiner and the agent over matters not related to the business of the company. Examiners and agents are both apt to be men of strong character and as such frequently differ.

It may seem that one goes beyond the title of

this paper in mentioning the subject of the medical director but upon him depends so largely satisfactory or unsatisfactory relationship of the examiner with his company that I trust you will bear with me when I express some of my views of his necessary qualifications. He is brought into the problems of the field representatives and solicitors through correspondence and personal contact and must be able to instill a belief in his professional ability and fair-mindedness when called upon to settle questions which arise in connection with the efforts of solicitors. He must not permit himself to become unduly suspicious and antagonistic and it is frequently necessary for him to weigh the determined facts until he can obtain a true idea of the facts in connection with any complaint which may be made to him by the company's agents with regard to examiners or by examiners with regard to agents, yet this should always be undertaken with the intent to do justice to those concerned and not in the hope of fixing the blame on anyone in particular. This is very necessary in order that examiners in the field and agents as well shall have complete confidence in the medical department. Personal contact between examiners in the field and the medical director and his assistants by means of visits to the field and visits to the home office by examiners located at important points serve to coordinate the work of the home office medical department and its examiners in the field to greater degree than can be accomplished by other methods.

Occasionally complaints with regard to examiners are made by agents shortsighted as to their real interest to the effect that competent examiners are incompetent because of agency reasons. It may happen that an examiner very competent medically may be decidedly criticisable from a business point of view. Before such an instance can be admitted, however, the medical director must be assured that such is in fact the case and that the examiner is negligent of the company's interests and not the victim of allegations resultant upon his having given satisfactory medical service. The loyalty of examiners to the home office which is essential cannot be maintained unless unjust criticism of them will not be recognized. A mutual and entire confidence between the home office medical department and the field examiners is an absolute essential.

It has been interesting to me, and I thought it might be to you, to note how much of the time at its annual meetings the Association of Life Insurance Medical Directors has seen fit to give to the subject of medical examiners and matters relating thereto since its organization. In its first fourteen years five addresses were made on the important subject of the medical examiner out of a total of twenty-five subjects discussed and the character of the work of the medical examiner entered as a basis into the development of the facts brought out in the remaining twenty papers. The subject has frequently been carefully covered in recent years and only a year or two ago a highly scientific medical director with an actuarial turn of mind conceived the idea that there might be a relationship between the mortality of the risks accepted in his company year by year and the percentage of negative answers by the examiners as to recommendation in each given year. Or perhaps it might be better stated that an increase in proportion of the risks not recommended by the examiner but accepted after postponement or various other modifications materially increase the general mortality, and vice versa. The discussion of this paper grew to be largely actuarial for the reason that those of us without actuarial information could not well comprehend it in its entirety. There is no doubt, however, in my mind that the doctor's premise was logical. The amount of work undertaken by him and by others at various times serves to indicate the importance and value of the medical examiner in his relationship to his company.

The medical section of the American Life Convention has also devoted a very considerable portion of its time to the matter of the medical examiner and his work.

Life insurance has become one of the bulwarks of the nation, permitting millions to exist with the comforting knowledge of the protection afforded their dependents by their investment and savings in it, which savings are uniformly invested in the development of sound industries—thereby again serving as a public benefit. The attention of many an individual is first called to correctible conditions of ill health or physical impairment when he undergoes an examination for life insurance and his life thereby prolonged. Surely a physician who devotes a portion or all of his time to life insurance work is even more justified in considering that he renders an efficient public service which constitutes the ideal of our profession than were he to limit his activities solely to the care of the ill or to preventive medicine.

PLEURISY IN RELATION TO LIFE INSURANCE*

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My purpose in presenting this subject is to emphasize facts which you already know in regard to the significance of pleurisy, but which some of you may not always have in mind when cases with such a history appear before you as applicants for life insurance.

A thought that is uppermost in the minds of insurance companies is whether or not a history of pleurisy means a history of a tuberculous infection.

The pleural cavities are readily accessible to bacterial invasion of all sorts and while the pleura may be involved as a result of extension of infection from the lungs, it would appear that infections more frequently occur through the lymphatic drainage from the head and neck.

Pleurisies that result from infection introduced through injuries through the chest wall, or as a result of a pneumonia that happens to be located on the surface of the lung, have a different bacteriological basis from those that occur unassociated with chest injuries and pneumonias, the so-called idiopathic pleurisies. It is this type of pleurisy that is so often due to tuberculous infection and that we have come to regard as a sign of tuberculosis and for that reason great care must be exercised in the selection of lives for insurance with such a history.

The reports from the Bureau of the Census at Washington tell us of the decrease in the tuberculosis death rate throughout the registration area of the United States during the past twenty years, amounting to about 50 per cent, with an especial decrease during the past five years. That this splendid result is in large measure due to increased hospital and sanatorium facilities for the care of the tuberculous was shown clearly by Dr. Louis I. Dublin in an address before the National Tuberculosis Association, June, 1923.

According to the last report we still have, however, in round numbers, about 100,000 deaths per year from tuberculosis.

From a general economic standpoint, this disease has always been of prime importance through the fact that young adult lives have been so largely numbered among its victims. To the life insurance companies it has always been a heavy financial burden, notwithstanding the care exercised in the selection of lives.

It requires but a hasty scanning of medical literature of the past twenty-five years or more to be convinced that we are faced with the necessity of thinking of tuberculosis whenever we think of pleurisy.

In 1905, Von Ruck, of Asheville, in writing on this subject in the New York Medical Journal reviewed the literature up to that time and reported statistical studies of various workers in the field of tuberculosis, from which it was concluded that an overwhelming majority of cases of so-called idiopathic pleurisy were of tuberculous origin. "Not only was this relationship conclusively shown by exact scientific diagnosis, but it stands in harmony with clinical observations in many instances in which the development of tuberculous disease has followed attacks of primary pleurisy after varying periods of time."

Von Ruck then gave the tabulated results of a later group of observers which combined numbered about 750 cases, and about 55 per cent of these afterward became definitely tuberculous.

In the examination of history records of 1,000 cases of tuberculosis, Von Ruck found a history of pleurisy in only 22 per cent. He felt that this proportion was too small for he had not infrequently demonstrated physical signs clearly indicating pleural thickening in patients who had denied any history suggestive of pleurisy.

The intimate relationship between pleurisy and tuberculosis has been shown by still another line of investigation, and I know of no more scientific and conservative report of this work than appears in the "American Review of Tuberculosis," 1921, by Van Zwaluwenburg and Grabfield, of the Department of Roentgenology, University Hospital, University of Michigan. Three hundred and sixty-six consecutive chest examinations formed the basis of this study, which was dependent upon the interpretation of shadows found over the apices and with greater frequency over the right apex. The results were carefully charted to indicate involvement of pleura alone, pulmonary, or a combination of the two. After discarding certain cases, the final group included only those in which three

*Read at Fourth Annual Clinic Week, Ramsey County Medical Society, St. Paul, January, 1924.

observers working together agreed as to the condition present.

While these cases were presented for examination in the three summer months when respiratory infections could be expected to be the least prevalent, some pathology of lung or pleura was found in about 50 per cent. The findings in the order of their frequency were: right apical pleuritis; left apical pleuritis; right pulmonary apical and left pulmonary apical involvement. By insensible gradations the shadows of pleural involvement pass into those of frank pulmonary involvement, and there is thus afforded another demonstration of the close association of apical pleuritis with pulmonary tuberculosis.

This work further points to the fact that chronologically the apical pleuritis precedes the pulmonary involvement. The infection probably reaches the pleura through the cervical lymphatic system and the prevailing tendency to spread is first to the opposite apex and then to the underlying lung tissue.

Turning now to the contribution to this subject that has been given by the life insurance companies, we find abundant testimony as to the soundness of the view that idiopathic pleurisy is, in the majority of instances, a tuberculous disease.

All of you perhaps know that a few years ago data were furnished by practically all of the large companies for a gigantic statistical study which was conducted by a committee composed of actuaries and medical directors. Among the subjects included in this investigation was the influence of a history of pleurisy on mortality of insured lives. The data contributed by the companies were based upon male lives accepted for insurance at standard rates covering a period of twenty-four years.

While the issues of only one month (January of odd years and July of even years) of each year was included, the abundance of data is indicated by the fact that over 23,000 lives were studied.

It is to be remembered that this was not a general population group, but a group of lives accepted for insurance after a medical examination and a review at the home office of all contributing information in support of or against the belief as to the presence of a tuberculous condition.

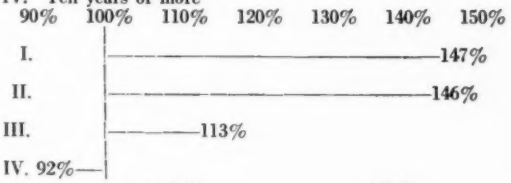
Mortality tables showing the expected death rate at each age among standard insured lives and covering the same period, were constructed and with those tables as a standard of comparison it was found that lives insured with a history of pleurisy (non-purulent) within five years of date of application gave a mortality experience about 50 per cent greater than the normal or standard, which means that in a group of lives in which the normal expectation was 100 deaths per year there actually were 150 deaths.

The statistical material was divided into groups according to the period of time between the history of pleurisy and the acceptance of the lives for insurance. On this basis four groups were made on those accepted, (1) within the first two years, (2) between two and five years, (3) between five and ten years, (4) after ten years.

PLEURISY, OTHER THAN PURULENT

Date of attack prior to application

I. Within two years
II. Two to five years
III. Five to ten years
IV. Ten years or more



	CASES	YEARS
I.	4070	23,216
II.	4524	26,666
III.	5322	33,648
IV.	9378	60,277
Total	23294	143,807

The above chart shows graphically that for insurance with the history of pleurisy, not more than five years removed, gave mortalities which were quite unsatisfactory. In reading the chart, the vertical line at the left may be regarded as indicating normal or standard (100%) mortality, and the departures from normal mortality by the lateral lines.

Figures are available to indicate the expected number of deaths in any group from each of the common causes, and applying that knowledge here, we find that the increased mortality is, in large measure, due to tuberculosis, for the number of deaths from that cause was three times the normal.

Furthermore, conforming to our general knowledge of tuberculosis, the mortality was relatively greater in the younger lives and also in those of under average weight.

This immensely valuable statistical study gives us reasonably firm ground on which to stand in our conclusions that the so-called idiopathic pleu-

risies are, in most instances, a manifestation of a tuberculous infection.

It is believed that the pleura acts to some degree as a barrier against the further spread of infection, but its effectiveness in this rôle is to be determined in individual cases only after a lapse of time sufficient to warrant the assumption of an arrest of the disease.

Those of us whose work does not bring us in intimate and frequent contact with tuberculosis need to be reminded from time to time of truths which we have long known, and it is with this thought in mind that I have been led to bring this subject to your attention.

The discovery and development of Insulin by Dr. F. G. Banting, Mr. C. H. Best and other co-operating investigators has brought relief to a multitude of sufferers from diabetes throughout the world. At a low price this boon has been placed within reach of all. But it is well known that only a beginning has been made in alleviation even of this one malady. Notwithstanding the magnificent advances that have been effected in arresting or averting many of the most grievous attacks of disease on human life, mankind is beset by enemies. Their strategy must be discovered and circumvented. This can be done only by patient research conducted in the main by skilled investigators who devote their lives to scientific inquiry. For these investigators the public at large must provide the means of support, for they it is who benefit immensely thereby. Such work has been going on quietly all over the world. Laboratories in the universities have groups of investigators working in co-operation under the direction of competent scientists. But only now and then does a result such as Dr. Banting achieved strike the imagination of the world. It is therefore but appropriate that advantage should be taken of it to appeal to the grateful public for support in making possible the continuance and prosecution of this work and of other investigations in medical science. To effect this and to signalize the discovery and the development of Insulin, the Banting Research Foundation has been created.

The purposes of this Foundation have been defined to be:

(a) To provide, in the first instance, further funds for the support of the Banting and Best Chair of Medical Research at the University of Toronto.

(b) To establish a fund for the adequate financial support of such scientific workers as may have proposed definite problems of medical research, and for whom funds are not otherwise available. Such assistance may be given to persons working in the University of Toronto or elsewhere.

All financial arrangements in connection with the collection and reception of the principal and subsequent expenditure of the income of the fund have been vested in a Board of Trustees, the members of which are appointed for a term of three years subject to reappointment at the end of their respective terms of office. The Trustees propose to make an appeal to the public for funds in the immediate future.

F. Lorne Hutchison,
Honorary Secretary.

THE VALUE OF MEDICAL EXAMINATIONS IN LIFE INSURANCE*

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On first thought, a subject such as mine may seem too elementary and almost unworthy of discussion, for, of course, most any one will say that there can be no question of the value of and the need for a medical examination before insurance can be issued to an applicant. However, I have in mind not only this value, but also the relative or the comparative value of one examination, or type of examination, as against another group or type. We who are reviewing thousands of examinations a month, from thousands of examiners, form rather definite ideas as to the kind of examination which is most valuable to us, and it is with the hope of transmitting some of these conclusions to you that this title has been chosen.

Moreover, there is a tendency, I believe, among certain life insurance executives, to question the value and the need of medical examinations in risk selection. Witness, for example, the practice of some Canadian companies who issue policies up to a certain amount without examination, also group insurance and industrial insurance. It is not very difficult to understand why an executive should have this doubt when he sees claims being paid every day on those who have been insured only a few months or a year or two, and finds such causes of death as cancer, tuberculosis, paresis, apoplexy, organic heart disease, nephritis, etc. A presumably careful examination was made only a short time before by a supposedly well qualified doctor, who reported nothing abnormal either in the history or physically. Even the medical director sometimes wonders if a careful examination was made. Very naturally both may well ask why American life insurance companies paid almost 15 million dollars to their examiners in 1922, and a great deal more last year. Of course, we know that physical signs are often obscure or even absent, that it would take a Philadelphia lawyer to question and cross question some applicants in order to get the facts, and that diagnosis, at best, is subject to many human errors. However, I am convinced that it is up to

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*Read at Fourth Annual Clinic Week, Ramsey County Medical Society, St. Paul, January, 1924.

us of the medical profession to demonstrate, as we never have before, that medical examinations in life insurance are valuable and necessary in order to obtain a satisfactory mortality, and to justify the annual expenditure of millions of dollars for these examinations by giving as intelligent and painstaking service to life insurance companies as we do to our patients. The service rendered in securing protection against death to the deserving thousands, yes millions, who receive insurance each year at a low cost and with safety, is as commendable and praiseworthy as the service given to suffering individuals whom we see on our daily rounds. Think what eleven and a half billion dollars of insurance, issued last year, will mean to widows and orphans of the years to come! Careful examinations and intelligent medical selection are the fundamental safeguards of the insuring public, without which the most inspired financial management would be useless. The savings from the mortality factor, together with the interest earnings and a low expense ratio, represent the difference between the gross tabular premium and the net cost of the insurance. The company and the department, which I represent, feel very strongly this responsibility to give our policyholders protection at the lowest cost which is consistent with good business principles, consequently we must exclude poor risks. I am sure that the same applies to all conservative and well conducted companies. It shall be my purpose, therefore, to try to show briefly how this is done and at the same time to plead for the conscientious co-operation of the local examiners to help in this laudable effort.

Our premise, then, is this: that the determination of an applicant's insurability depends primarily upon the medical examination. In the early days of life insurance, the applicant was not examined. He simply furnished certificates of birth, of good health and of good character. With the advent of active solicitation, as the agency system grew, and with a consequent increase of the chances of selection against the company, medical examinations became more necessary and, as time went on, more exacting, to protect against impaired lives. It is a well known fact, yes, almost axiomatic, that the impaired life seeks insurance, while the healthy and normal individual must be urged to apply. The marked advance in physical diagnosis, following the middle of last century, was another factor which stimulated insurance examinations, and since then the bond between the two has become closer and closer.

It was not until the seventies that medical selection began to build on a safer foundation by cementing an alliance with the actuarial science. Before that time, the selection of risks depended almost entirely upon the individual judgment and experience of the doctor who did the selecting, and the law of averages was scarcely considered. As the years went by, medical directors and actuaries began to work together and to formulate rules for risk selection. Some of the earliest studies in this new medico-actuarial science were undertaken by the famous actuary, Emory McClintock, when he made an investigation, in 1877, of the Northwestern's mortality experience by special groups of risks. The first count covered such classes as residence, occupations, amounts, kinds of policies, male and female risks, etc. In '79, the first truly physical impairment was investigated, namely, overweights. In the late '80's, a few classes, including family and personal histories, were suggested by Doctor Fisher as worthy of actuarial investigation. From these beginnings grew, through many intermediate steps, the later combined studies of the thirty-four companies in 1903, and the forty-three companies in 1912. In this last mortality investigation, 183 classes or groups were investigated, including occupations, medical impairments, habits, family history, build, habitat, races, etc. This is now the principal basis for risk selection, except as individual companies have counts of their own which are sufficiently large to be followed safely. Now all this statistical material, to be valuable and accurate, presupposes careful medical examinations from which the data have been gathered. The results obtained from the use of these tables in risk selection seem to indicate that the examinations were made with reasonable care. However, another factor contributed to the accuracy of the figures obtained, namely, numbers. Approximately three million policies were studied, and of course the relatively small percentage of poor examinations was probably not sufficiently great to disturb the general averages. However, if this information is valuable as it stands, how much more so would it not be, had every examination been made with proper appreciation of the need of accurate information?

This is not the time nor the place to give an exposition of risk selection as it is worked out in de-

tail, for this cannot be handled briefly, but I do wish to repeat and to emphasize the statement, again and again, that a careful examination is the primary requisite to the proper valuation of a risk.

We who, at the home office, review the reports of the examiners in the field, must have confidence in the pictures of the applicants which are sent to us. You are our eyes, ears and hands, which convey accurate impressions of the man before you, so that we may be able to place him in this or that group and decide as to his insurability. An examiner represents directly the medical department by which he was appointed and he must ever have its interest in mind rather than that of the agent or of the applicant. First and last it is the examiner's duty to report the facts as he finds them. He is being paid for furnishing a word picture of the applicant and not for his opinion as to the man's insurability. Please do not misunderstand me. We do appreciate your opinion of the interpretation of symptoms, conditions and physical findings, but the medical director is especially trained to evaluate these with respect to risk selection as determined by the law of averages. He does not think in terms of individuals but in terms of large groups under observation for a long term of years.

A life insurance medical examination blank is simply a somewhat extended history sheet, where specific questions are asked in regard to an individual's age, race, social status, residence, insurance history, occupation, weight, habits, family history and personal history. Also the blank contains a number of questions as to the physical condition as brought out by the examination of the circulatory, the respiratory, the digestive, the genito-urinary and the nervous systems. Perhaps the day will come when the blank of many questions may be discarded, and it will be possible to depend upon the informal report of the examiner, relying upon him to bring out all the salient points. But not yet have we reached this state, though each company no doubt has many examiners who could be allowed this freedom. However, it is well to remember that as a chain is only as strong as its weakest link, so an examination blank must be made to fit the weakest examiner.

From an observation of many years, I am impressed with the perfunctory way in which many examinations are made. It is apparent that we have not entirely gotten away from the early idea in life insurance that every man who applies for a policy should get it, for his dependents need the protection. On the other hand, the primary consideration in an examination is to safeguard the interests of those who are already policyholders. To become a policyholder, the applicant must measure up to a certain standard, which differs somewhat in various companies, but the examiner has only one duty to perform and that is to give the facts in the case as they are brought out by the questions on the blank. No matter how well the doctor knows the applicant, the questions must be asked and the examination made, taking nothing for granted. Many instances could be cited where an examiner has been much embarrassed because he failed to draw out a complete history from a well known applicant. Only the other day we received an examination which gave no history of any digestive disturbance and showed nothing abnormal. Almost in the same mail came a letter from the examiner which told us that the man had been operated on for gastric ulcer two days after the examination was made. Of course the applicant withheld facts in regard to his history, but it is well to have in mind always that this is not uncommon, and that a little time and patience in asking the questions might bear fruit. Your patient comes to you and, as a rule, tells you freely and fully all his symptoms, but the applicant for insurance expects you to find out about his past symptoms and diseases by definite questions. Oftentimes the acute examiner, by minor leads, unearths important facts. Don't overlook the importance of the history. There are many diseases which constitute distinct impairments and cause either limitation or rejection. Some companies reject applicants who have had gallstones, gastric or duodenal ulcer, epilepsy, syphilis, epithelioma, tuberculosis, etc. Certain other conditions are sufficient reason to postpone for a definite period; for example, appendicitis, renal colic, pleurisy, articular rheumatism, malaria, nervous prostration, asthma, sunstroke, etc. The practices of the different companies need not worry the examiner; he will learn them in time; but it is necessary that he question the applicant sufficiently to form an opinion as to the nature of the disease, and, if there is still a doubt in his mind, to secure the diagnosis from the attending physician. In this connection, an examiner should decide in his own mind what is important and what is unimportant, but surely he should recognize the fact that if a condition is worthy of mention it is also worthy of explanation.

Much of our correspondence is caused by unexplained and incomplete or omitted answers. As a matter of general information, it is well to mention that that part of the examination which is signed by the applicant becomes a part of his contract and must be complete in every detail; further, that corrections and additions to this part, after the paper has been signed, must be attested by the applicant and not by the examiner.

In the history appear also questions as to occupation and habits. These are not primarily medical in nature, but they are just as pertinent. Many occupations are hazardous and cause rejection or limitation. Perhaps there is no one phase of medical selection which causes so much confusion as occupations, for one company accepts what another declines, and some companies rate up certain occupations which are accepted freely by others at standard rates. This will all be ironed out in time and standardized, but in the meantime the examiner can help by putting down a careful statement as to the nature of any unusual trade or occupation.

Habits in the use of alcoholics are most important. There are no questions on the blank which cause more trouble, for men are most reluctant to give the facts, especially now since we have so-called prohibition. An examiner should never assume that he knows all about a man's habits and try to answer these questions without asking them. Nor should he allow an applicant to record answers which are not in accordance with the facts as they are known to the examiner. There have been many studies of the effect of the use of alcoholics on mortality and it has been demonstrated repeatedly that total abstainers are the best risks, while the mortality rate increases in proportion to the amount of alcohol used. (Table I.) Therefore the value of the examination depends also upon the ingenuity of the examiner in eliciting the correct answers to these questions.

A proper physical examination can not be made hurriedly nor in noisy surroundings. It must be made with the same painstaking effort that you give your patient when he comes to consult you for an obscure condition. As with the history, a certain number of applicants have something to hide and they will not help you to discover the impairment. Many a man has a history of a previous rejection which he does not admit. Of course the company will know about it through the "Interchange" and I know, from experience, that it is rather embarrassing to be informed that a goiter or a heart murmur, or albumin, or sugar has been found more or less recently in an applicant, who was passed as first class in every way, and then discover, upon re-examination, that the impairment is still present.

Summary of the Mortality Experience of The Northwestern Mutual Life Insurance Company, with references to use of Interchanges. A.M. Select and Ultimate Tables.

	Policies	Deaths	Actual	Tabular	Percent
A- Total Abstainers	132,649	4,967	10,960,600	15,745,739	69.6
B- Moderate Users	110,136	5224	18,045,300	23,252,821	77.6
C- Regular Beer Drinkers	15,412	767	2,247,200	2,464,707	91.2
D- Regular Spirit Drinkers	3,206	289	1,601,100	1,257,773	127.3
All Classes	261,403	11,247	32,854,200	42,721,040	76.9

(Issues 1901-1908 inclusive to Anniversary in 1915.)

TABLE I

In explanation of above table, the following rules were used to govern classification:

A. *Total Abstainers.*

B. *Moderate Users of either Malt, Vinous or Spirituous Beverages.*
   1. Beer or ale, not daily nor more than 3 in any one day at the most.
   2. Porter or strong ale, not daily nor more than 2 in any one day at the most.
   3. Light wine, not daily nor more than 4 in any one day at most.
   4. Strong wine, not daily nor more than 3 in any one day at most.
   5. Spirituous liquor, not daily, nor more than 2 in any one day at most.

C. *Regular Beer Drinkers*
   1. One who uses four or more glasses of beer or ale in any one day at most, or 5 or more in a week, or a daily practice of 1 or more. Include where wine or whisky is also used moderately *but not* enough for Class "D."
   2. No "wine only" cases in this class.
   3. Two glasses of beer and wine a day.
   4. Beer and wine at meals, moderately.
   5. Porter or strong ale daily, or 3 or more in any one day at most.

D. *Regular Spirit Drinkers*
   1. One who uses all kinds but not entitled to Class "B."
   2. Wine daily, 5 light, 4 strong, or more.
   3. Spirituous liquors daily, one or two drinks a day, or 3 or more in any one day at most.
   4. Two glasses of beer or wine or whisky a day.

The Company has never knowingly accepted men who might be termed free users of either beer, wine or whisky, nor those who use alcohol to the extent of intoxication at times.

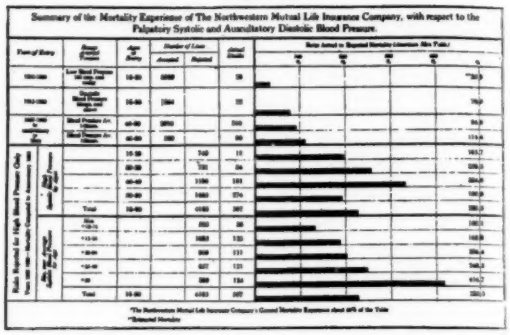
It was missed only through carelessness, but that is no excuse. An examiner must be ever on guard against the dishonest applicant. Fortunately there are not many such, but still it is strange how a man may justify himself in putting something over on an insurance company when in all other business deals he may be most scrupulous. Again the idea is prevalent that it is up to the doctor and to the company to find out, and, if he can get by, he holds himself blameless. Has an applicant been coached or specially prepared for the examination? It is well to think of this possibility. For example, is it not possible for a diabetic to pass a satisfactory examination, if he withholds the history and is under treatment with insulin or on a modified diet? The careful examiner would undoubtedly note the marks of the hypodermic needle or have his attention called to the subterfuge in some other way. Let me cite an example of a rather remarkable instance of careful observation. Two or three months ago, one of our examiners reported upon a man that he could not find anything definitely wrong with the circulatory system, but still there was a doubt in his mind as to the condition of the myocardium. He asked that we get the opinion of another doctor. The second examiner also reported that the heart sounds were normal, except for some disturbance of rate and rhythm; the blood pressure was normal, and so was the urine. We declined the risk. A few days ago we were informed that this man died suddenly. This is the kind of opinion and co-operation which is valuable.

No paper by one of Doctor Fisher's assistants would be complete without some words about blood pressure. We all know of many men and women who have lived for years with a high blood pressure, but we have demonstrated that on the average, large groups of men with a persistently high arterial tension show a mortality higher than normal. (Table II.)

Perhaps I have said some things which might be construed as a criticism of our profession. If such it is, I hope that it may be thought constructive and of some value. I believe in the medical profession, and I further believe that there is no other profession or class of men which, as a whole, ranks higher in honor and integrity or in the service given. In the early history of life insurance, many companies would not permit a family physician, even though he were an appointed examiner, to examine his patient for life insurance, for fear of prejudice in favor of the patient. It seemed to Doctor Fisher that this reasoning was wrong, for the family physician, provided he was honest, was in a better position to furnish the company with reliable information concerning the applicant's past and present health record than any one else. So such examinations were encouraged. About thirty years ago, we began to keep a record of all approved examinations made by a regularly appointed examiner of the company, who was also the applicant's family physician. A few years ago, 38,550 such cases had been accumulated and the mortality of the class was 12 points better than the general average mortality of the company for the same period. "This certainly speaks well for the integrity of the man whose duty lies in one direction and his sympathies in another."

In conclusion:

TABLE II.



Summary of the Mortality Experience of The Northwestern Mutual Life Insurance Company, with respect to the Palpatory Systolic and Auscultatory Diastolic Blood Pressure.

TABLE II

Table II gives a summary of the Northwestern's Blood Pressure Studies. The palpatory systolic pressure has been used uniformly throughout because this was the way we began. The groups referred to in the first four lines are accepted risks. All the others are rejected risks. We were able to follow these latter cases,

1st, by previous policies in this company,

2d, by information from other companies,

3d, by correspondence with examiners and agents.

In this way we learned when death occurred and in most cases the causes of death.

No cases are included where the blood pressure later became normal.

In none of these cases was any other impairment found; the rejection was based wholly on hypertension.

Of the 507 deaths, 363 were due to cardio-vascular and renal diseases, or a little over 71 per cent.

It is apparent, from this study, that a persistently high systolic arterial tension results in an excessive mortality, and the higher the pressure the greater the death rate.

1. A life insurance examination is a serious undertaking, upon which depend a satisfactory risk selection and a favorable mortality.

2. Its value to the company you serve rests upon the facts which you are able to elicit by careful history taking and through physical examination.

3. Let us all, both examiners and home office representatives, bear in mind that when a poor risk is given insurance and becomes an early claim, it is the policyholders who pay the loss, for they constitute the company. On the other hand, when we are diligent in our efforts to exclude such risks, we render a distinct service to the large numbers who depend upon us for the protection of their families at the lowest possible cost. Our consideration must always be the greatest good for the greatest number.

WOULD-BE SYLPHS MUST QUIT EXTRAS

Eating little at meal times and much in between is the poor system which most persons employ to cut down their weight. Then they wonder why the scales are discouraging to any honest effort to reduce.

Some pitfalls in the path of those who have joined "the cult of sylphs" are given by Dr. L. M. Davidoff, Boston physician, in a humorous but helpful article entitled "Now This Matter of Reducing Weight!" which is featured in the April issue of HYGEIA, popular health journal.

Tidbits and "extras" cause the downfall of most of those who are following the national craze for reducing, says the article.

The average woman needs a diet of between 2,300 and 2,800 calories per day; a healthy man's diet should consist of between 2,800 and 3,000 calories daily. To reduce weight appreciably it is necessary to cut down to 1,600 calories.

"But suppose," says Dr. Davidoff, "that a woman has reduced her food intake to 1,600 calories at meal times, let us consider what her extra tidbits amount to."

One pound of chocolates even though it is made to last over four days will be equal to about 800 calories a day.

Tea with sugar and without cream adds another 40 calories.

One cup cake with the tea raises the total by 150 calories.

Tasting the dinner, eating the extra frosting, "not wasting" the whipped cream, etc., adds 200 calories more.

Then it is a shame to throw away perfectly good food that is left over from meals! Think of the poor orphans across the water who haven't even bread enough! So instead of the garbage pail, 300 or 400 calories more.

The "apple a day" is eaten religiously with a resulting addition of 50 calories.

If it is theater night, or bridge night, or sewing circle night, two or three delicate cheese sandwiches with hot chocolate and whipped cream—500 calories.

FUNDAMENTAL PRINCIPLES AND RECENT CONCLUSIONS IN SURGERY OF CONGENITAL CLEFT PALATE*

TRUMAN W. BROPHY, M.D., D.D.S., F.A.C.S.
Chicago

While attending the Pennsylvania College of Dental Surgery of Philadelphia I also had the privilege of attending the surgical clinics of Dr. James E. Garretson, the father of oral surgery and the foremost man of his time in this special field of work. It was my further opportunity and pleasure to attend regularly the clinics of Dr. S. D. Gross, the father of American surgery, of Dr. Joseph Pancoast, one of the foremost surgeons of his time, of Dr. J. Ewing Mears and of Dr. D. Hayes Agnew, whose name was broadcast throughout the world by reason of his services to our martyred president, James A. Garfield.

After graduation fifty-one years ago I concluded that, inasmuch as I had never before been as far east as the boundary between Illinois and Indiana, I would visit the surgical clinics of Washington, Baltimore, New York and Boston, presuming that I would never again have an opportunity to travel so far east.

In New York I visited the clinics of various surgeons of renown, among whom was the leading orthopedic surgeon of the day, Dr. Louis Sayre. I presume many of you know that he was congenitally lame. Probably through his misfortune he was led into surgery, and orthopedics especially appealed to him.

It was in Dr. Sayre's clinic that I was prompted to undertake a kind of work which he declared was impossible. To this clinic, which was large, patients came who suffered from all sorts of deformities, congenital and acquired. On my first visit, there was among them a tall, thin, poorly clad woman, bearing all the evidences of extreme poverty. In coming, she had faced a snow and rain storm, so common in the last days of March. Her face wore an anxious, troubled look. She had brought her little child, two weeks old, to the great surgeon with the hope that it might be cured.

Its deformity was one of the most conspicuous and distressing that ever saddens a home. It consisted in protruding premaxillæ, double cleft lip

*Read by invitation before Minneapolis Surgical Society, Dec. 6, 1923.

and complete cleft of the palate, the vomer not being attached to either side.

The surgeon took the child in his hands and explained to the class the nature of the deformity. He said in substance, "Gentlemen: This child's deformity is so extensive, the tissues are so abnormally placed, that it is not amenable to successful treatment—the treatment that would bring all the parts into normal relation. You will observe that the premaxillary bones are more prominent than the nose: the prolabium is far removed from the lateral portions of the lip. We have one course open to us and that is to excise the bones, after which the clefts in the lip may be closed." He held the child up before the class and said, "I grasp with my hand the sides of the child's face and find that I am able to move the bones toward each other. If we had some way by which these bones might be approximated, the premaxillary bones brought into correct relation with the maxillæ and if we could, after placing them in contact, immobilize them and bring about a union, we could go far toward correcting the deformity. But such an operation has never been performed. We have no means of doing it."

The doctor handed the little child back to its weeping mother, who stood holding it fondly in her arms, still looking at him while he informed the class that some months later he would excise the premaxillæ and sew up the lip and when the child was nearly grown an artificial palate could be provided as an aid to speech.

The incident was tragic. The expression of the mother's face I can never forget. She turned away with a saddened heart, to wander through the beating storm with a feeling that there was scarcely any hope for her unfortunate child. A deep impression was made upon the class. Not a sound was heard among the students while the child's condition was being described by the surgeon. Everyone, it seemed to me, was in deep sympathy with the mother. Such was the experience of this mother—and even today oftentimes little hope of help is offered to the mother, who is always the greatest sufferer.

I repeat Professor Sayre's statement: "I grasp the sides of the child's face with my hand and find that I can move the maxillary bones toward each other. If we had some way by which these bones might be approximated, the premaxillary bones brought into correct contact with the maxillæ and if we could, after placing the bones in contact, immobilize them and bring about a union, we could go far toward correcting the most conspicuous deformity known to mankind. But such an operation has never been performed. We have no way of doing it." The pale-faced, disappointed mother is still before me; the stentorian voice of the late premier American orthopedic surgeon still rings in my ears as he said: "Such an operation has never been performed. We have no way of doing it."

It was then I was obsessed with a desire which has been never-failing but increasing to devise a way that would enable me to bring about a union of the separated, misplaced bones in such deformities. More than the average human lifetime has been devoted to devising and improving a method which will give as a result a hard palate of normal breadth, a long, flexible, well-formed soft palate and an arch or framework upon which to construct a full, well-shaped lip and normal nose. Upon my return home in the spring of 1872, I began to work conducting experiments upon the bones of young animals. Professor Garretson had told us that because of the fact that the bone was not sufficiently ossified to fracture, he could take the tibia of a kitten and tie it in a knot. It is estimated that at birth, bone is about one-half organic matter and therefore capable of bending or moving when pressure is made upon it. So I believed that the maxillary bones in a young cleft palate patient might be bent and moved into proximity.

I found that at that time in New York City and quite generally through the country, many of the leading surgeons had abandoned palato-plastic surgery on the ground that their operations were generally failures. Garretson has said: "As generally practiced, it is rather difficult of performance and so frequently unsuccessful that the surgeons seem disposed to avoid the responsibility of it." Non-union occurred in a large majority of their operations and failure of function nearly always followed. Had they understood the proper age at which to perform these operations, the order of procedure of the different steps and especially the correct technic of the bone surgery essential to this work, they would have operated on these patients in infancy with good results.

From 1860 to 1880 and later, the great prosthetist, Norman W. Kingsley of New York, with numerous assistants, was occupied with construction

of artificial vela for cleft palate patients, many of whom had undergone unsuccessful operations.

In the light of surgical advancement and the development of modern methods of procedure, the old time theory that infants could not endure palate operations and that they should be made only on children from seven to ten years of age or thereabouts, has become a thing of the past. We now know that every advantage is gained by early operation which allows the proper order of procedure; less shock and reaction, greater ease of manipulation and results in correct function. To delay operating until after habits of speech have been developed, which are frequently so defective that the individual cannot be understood, is oftentimes an irreparable mistake.

All surgery of the palate should have for its goal perfect function, that is, perfect speech. The test of success is the quality of enunciation resulting. Two phases of palatal surgery have especially to do with this: first, the union of the separated bones of the palate including the management of the premaxillæ and, second, the control of the tuberosities in their relation to the soft palate. These two fundamentals I wish to emphasize, for without a proper conception and execution of these in palatal surgery there is small hope of securing satisfactory results either in form or function.

I wish to present to you briefly the course which I am convinced leads to the nearest approach to normal form and function in the palate. This course provides for operation in early infancy, it contemplates the establishment of a *normal palatal arch* and the *prevention* of the *spreading* of the *tuberosities*, it calls for *three stages* in the treatment of typical double cleft of the lip and palate and *sometimes four*, if complicated by protruding premaxillæ. These stages are as follows: (1) the freshening, approximation and immobilization of the cleft bones so that union may take place; (2) the closure of the lip; (3) the closure of the soft palate; (4) elevating the nose, which may have become flattened by moving the premaxillæ backward.

1. This step should be done as soon after birth as is expedient. I have found the fourth to tenth week most satisfactory, as in an otherwise normal child all functions of the body have become fairly well established by that time.

2. The closing of the lip should be done in from six to ten weeks after the bones have been approximated.

3. The closing of the soft palate should be deferred until just before speech is attempted, that is, not earlier than the eighteenth month.

4. The nose should, if necessary, be elevated later.

While agreement is fairly general now as to the wisdom of the early operation, uniform procedure is not so general. It is still all too common to find surgeons closing the lip first, depending upon the traction of the orbicularis oris muscle to accomplish the desired effect upon the bones; or passing a single wire through the anterior part of the separated maxillæ, thus bringing them together. The closing of the lip and the resultant traction of the orbicularis oris muscle *will* gradually move the anterior part of the cleft bones into contact, but the bones will not, as a rule, be normally approximated or united. The bone carrying the premaxilla protrudes beyond the maxilla of the opposite side, leaving an ugly malformation of the nose and arch. Besides, there cannot be union of the bones with the muco-periosteum intervening. They may not even meet, they remain malposed and leave the patient deformed throughout life.

A wire suture passed through the anterior part of the cleft bones will often cut out. It is more than likely to do so unless an incision is made over the line of union between the maxilla and premaxilla of the side opposite the cleft, the anterior half of the bone separated, the protruding premaxilla crowded downward, either bending or fracturing the lingual surfaces of the bone, so that an approximation of the cleft in the alveolar processes may be made.

MANAGEMENT OF PREMAXILLAE (Fig. 1)

A review of the literature convinces me that protruding premaxillæ have never received the careful attention which has marked the investigations of surgeons in treating other physical defects. Some authors advise excising the bones; others advocate closing the lip over them when possible; still others advise removing a V-shaped piece from the vomer, moving the bones back and closing the lip over them. We often find the vomer divided, the premaxillæ moved backward, the cleft lip closed and no effort made to freshen, approximate and stabilize the bones.

Protruding premaxillae, separated as they are

from the maxillæ, should be considered as a recent fracture and so treated. *Under no circumstances should the premaxillae,* even though they amount to only a small tubercle on the tip of the nose, *be*

Fig. 1. Profile of patient with protruding premaxillae.

removed. These bones, together with the teeth which they embrace, have an important function. They add symmetry and beauty and impart normal contour to the face. Their loss means prognathism with its unsightly deformity. The upper lip recedes and the nose becomes broad and flattened. The superior arch becomes contracted so that the upper teeth occlude on the lingual surfaces of the lower. The loss of these bones is always unnecessary, unsurgical and should be deplored. Neither should they be excised nor simply forced back (Fig. 2). Would a surgeon feel that his duty was well done in the treatment of a compound fracture of the femur if he crowded the fragments into place without removing the intervening tissue and then closed the external wound? Would he expect to secure bony union without the application of splints and without immobilizing the parts? Similarly, a normal maxillary arch can be secured only by treating the parts in the same manner as one would handle a fracture, i.e., remove intervening soft tissues and approximate the bony fragments.

The premaxillæ should therefore be moved into place after freshening the surfaces which are to come into contact. The compact bone should be removed and the freshened surfaces of cancellated bone placed in contact and immobilized. When this is done, the soft tissues covering the bones may be sutured with horsehair. To divide the vomer, move the premaxillæ back and make no attempt to unite them to the maxillæ, is unsurgical, cannot produce a normal arch and may be likened to the treatment of a fracture elsewhere without assuring bony contact and immobilization with resulting non-union. The wires should not be passed through the premaxillæ but anterior to them and beneath the soft parts.

Fig. 2. Result following the excision of the premaxillae. Note contraction of upper lip and protrusion of the lower. (Author's case.)

An attempt to move the premaxillæ backward should not be made in a patient younger than three months, because the bones have not become sufficiently ossified to form well defined alveoli. Besides, the lateral surfaces of the teeth are often covered by the soft parts only. Obviously, the teeth at this early age may be easily displaced.

ADJUSTING WIRE SUTURES

Introducing the wires is not difficult for the surgeon who knows the technic. Passing the wires through the maxillary bones in the usual way anteriorly and posteriorly and adjusting the lead plates enables the operator to approximate the alveolar processes and at least one-third of the palatal plates of the maxillæ, moving and holding the tuberosities in normal position, so that when the soft palate is united it will be of normal length and flexibility.

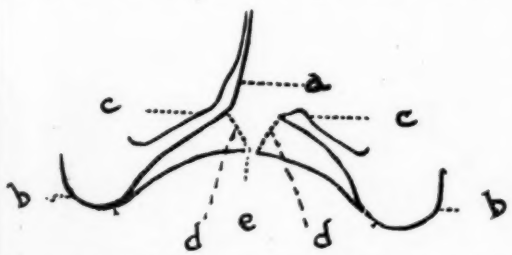


Fig. 3. Illustration showing the position of the horizontal plates of the maxillae and the vomer, as they usually appear in single cleft lip and cleft palate. b—b, alveolar processes; c—c, horizontal plates; a, vomer; e, separation of the hard palate as it would be if the horizontal plates were lowered; d—d, lines of descending arch.

When the posterior two-thirds of the maxillary plates are elevated at an angle of 45 to 75 degrees, their borders do not meet (Fig. 3). The abnormal elevation of the posterior two-thirds of the horizontal processes of the maxillary bones is lowered by means of the wires and lead plates (Fig. 4).

Criticisms have been offered by men inexperienced in using lead plates or without the opportunity to observe their proper use, that they are likely to produce necrosis of the bone. I have never had nor have I ever seen a case of necrosis of bone follow the correct use of lead plates. If it occurs it is due to defective technic. Recently a patient returned to me who had worn these plates for two years, without the slightest inconvenience and without injury to the parts.

SPREADING OF THE TUBEROSITIES

I have spoken of the closing of the lip first as one means of approximating the separated bones. The lip operation is one of the oldest in the annals of surgery, being described by Celsus, who was a contemporary of Tiberius (42 B. C. to 37 A. D.).

When the anterior part of the cleft is brought together either by the lip traction plan or by the single wire, the surgeon fails to give consideration to the consequent separation of the bones posteriorly. Every surgeon experienced in this work realizes that oftentimes these bones are widely separated posteriorly, due to the moving together of the anterior part of the cleft and action of the muscles and they cannot assume a normal position unless measures are employed to overcome this separation. The maxillæ act as levers, the malar processes becoming the fulcrums, and as the anterior ends of the maxillæ are drawn together the posterior ends move apart (Fig. 5).

Unless steps are taken in early infancy to prevent the tuberosities from spreading (as by the use of wires not only anteriorly but posteriorly) the bones will widely separate and the palate will be shortened to such an extent that perfect speech will seldom be secured. When the tuberosities are abnormally separated the soft palate, when united, will be put on the stretch and consequently shortened so that it cannot reach the post-pharyngeal wall; it will be like a drumhead without flexibility or resilience. If lateral incisions are made through the soft palate in an attempt to relieve the tension a great mass of cicatricial tissue will result, making

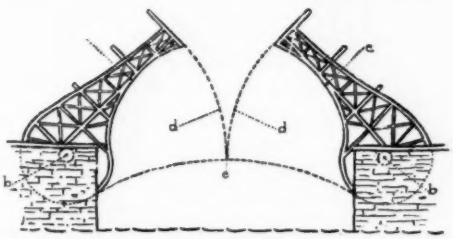


Fig. 4. Following the lettering of Fig. 3 as far as possible, for we have no a, to represent the vomer, b—b are the pinions of the bridge which correspond to b—b, the alveolar processes in Fig 3; c—c, correspond to the horizontal plates of the palate bones, misplaced upwards; d—d, lines of the descending arch which terminate in the meeting of the hemispheres of the bridge at e.

it thick, unwieldy and inflexible. It must be remembered that lateral incisions oftentimes divide the fibers of the tensor palati muscle, which has a two-fold function—that of making tension on the palate and dilating the pharyngeal orifice of the Eustachian tube during the act of swallowing. The result of the division of this muscle may thus lead

to early defective hearing, due to destruction of the continuity of the muscle and consequent failure of the normal dilation of the pharyngeal orifice of the Eustachian tube. When operating on the soft palate, the posterior wire should be passed as nearly as possible through the center of the tensor palati muscle as it swings around the hamular process, thus suspending the contraction of the muscle until the hemispheres of the palate unite.

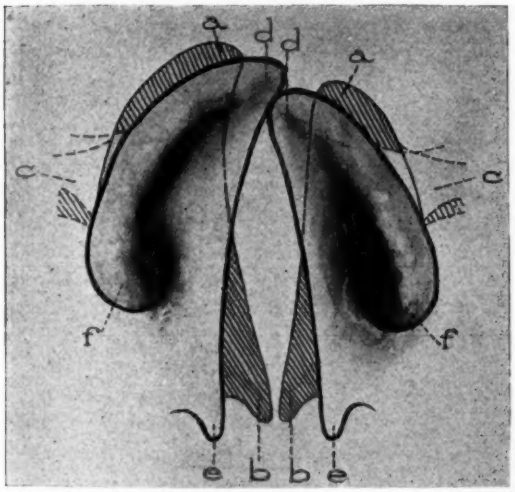


Fig. 5. Drawing showing change in position of the palate and alveolar processes due to either contraction of the orbicularis oris muscle after the lip operation or the result of moving the anterior alveolar processes together.

a—a. Bones widely separated at birth.
b—b. Posterior part of cleft at birth.
d—d. Anterior part of cleft after alveolar processes are moved together but not united.
e—e. Posterior part of cleft has widened. As the anterior part moves together the posterior part separates.
c—c. The malar processes, the pivots upon which the leverage is exerted to move the posterior parts outward while the anterior parts are moved inward.
f—f. The tuberosities widely separated as the result of failure to move them together or to prevent them from separating.

I regret that I have not time to discuss the plastic surgery of the lip, the management of the defective nostril and the operation upon the nose, operations so important in rounding out the work of making normal these patients who are the victims of such distressing conditions. But what does it avail, to produce the most careful and painstaking operation on the lip, if underneath there is an improper foundation for this superstructure? There must first be provided a normal, well-rounded arch upon which to build a well-shaped lip and there must be a normal position of the tuberosities in order that a flexible, resilient soft palate of sufficient length may be produced. (Figs. 6 and 7 contrast the two arches.)

IMPORTANT POINTS TO BE OBSERVED IN CLOSING PALATAL CLEFTS

My observation has been that function often has not been considered as an object to be attained. It seems that operators too frequently aim to close the cleft without achieving the all-important anatomical functional result. As I have said, function is dependent more on preventing the tuberosities from spreading than any other factor. When they *are* spread in young infants they must be narrowed to their normal breadth.

Moving the bones together in the anterior part of the cleft without attempting to prevent the tuberosities, which are oftentimes already abnormally separated, from further spreading contributes to the making of a short palate followed by defective

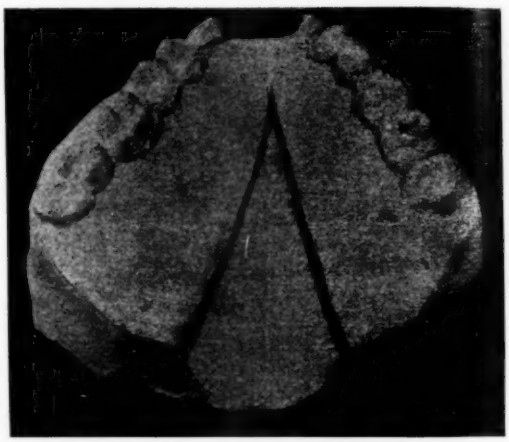


Fig. 6. Cast showing the premaxillae removed, and extremely broad cleft of the palate. The distance between the buccal surfaces of the third molars is 3⅜ inches. (Author's case.)

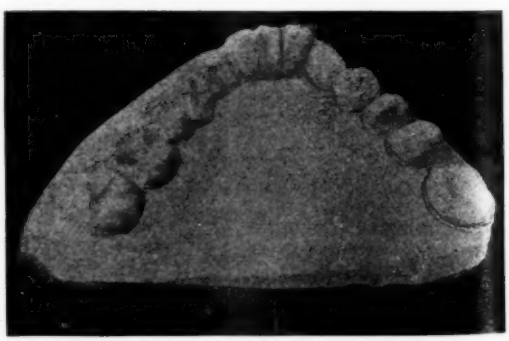


Fig. 7. Lower arch equally broad. Compare with preceding figure.

speech. Spreading of the tuberosities makes the palate too short and a palate too short makes the function of speech defective. The surgeon who permits the tuberosities of the maxillæ to spread,

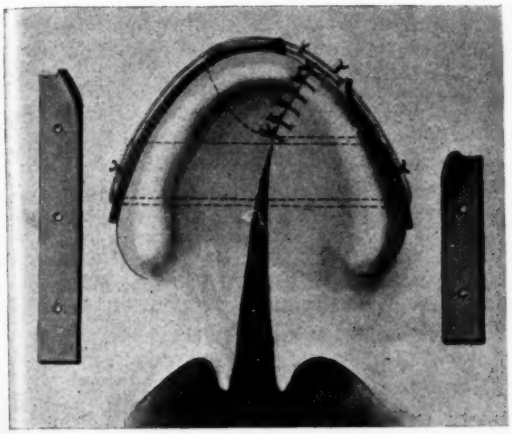


Fig. 8. All wires and plates in position, maintaining the parts in quiet contact until union is accomplished. Lead plates, No. 13 American gauge, shown at sides, perforated for the passage of the wires.

thus making it impossible to secure a long palate, will meet with failure in his results and usually correct speech will be made impossible. In such cases, to make a palate that will reach the post-pharyngeal wall, a section of each of the palato-pharyngeal muscles may be added to it.

When the bones are separated at birth, there is only one logical course to pursue, that is to freshen the surfaces that should be united as would be done with fracture of any other bone and approximate and immobilize the fragments. All general surgeons *do* so treat fractured bones. The *separated* bones of the palate should receive like treatment (Fig. 8).

To fail to unite the bones in early infancy usually leaves a deformity throughout life. A long, flexible soft palate, correctly functioning, is largely dependent upon a normal bony arch.

The surgeon, after operating on a soft palate in a youth or adult, finds the united palate tense and short. He reasons it is due to atrophy prior to the operation. It may be due in part to atrophy, but in a large majority of such cases spreading of the bones is an important factor in making the palate short, tense and drumhead-like.

The mattress suture is often valuable in the muscular tissues, but the interrupted suture is more desirable in the muco-periosteum with an occasional mattress (end to end) suture.

Tension of the palate is relieved to a great extent by lowering it as far laterally as the hamular process instead of making incisions in muscular tissue (Fig. 9). Failure of union of the soft parts is often due to failure to properly denude the bones of the muco-periosteum and to improper suturing. An operator sometimes fails by making his sutures too tight. He must bear in mind that the tissues will not stand pressure and stretching; there must be relaxation sufficient to insure good circulation. Failure of union of the soft parts is sometimes due to the cutting out of sutures. The proper use of silver wires and lead plates will avoid this.

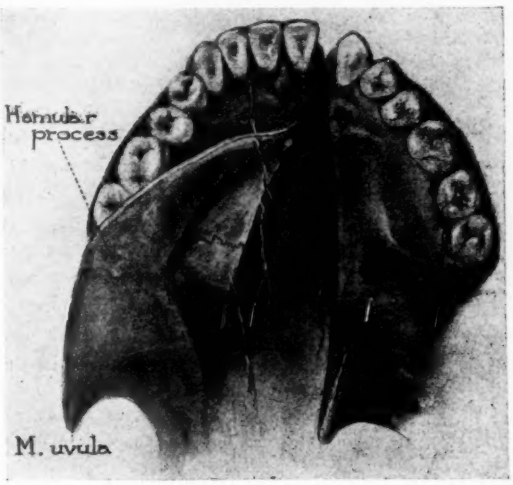


Fig. 9. The muco-periosteum is denuded from the bones of the palate as far back as the hamular process of the sphenoid bone. The flaps are then approximated and united.

The lead plates (Fig. 10) are not intended to be used for stretching the palate and pulling the edges together, but are to be used when the wires are inserted and the palate sutured—when the plates are put gently in contact with the mucous membrane and the wires twisted, but without tension. The plates are to prevent the sutures from cutting out and to hold the edges of the cleft steadily together. They also act as splints, so that when the palate moves it moves *en masse*. Dr. Hayes Agnew cut the tensor palati muscles to relieve tension. The wires and plates relieve tension without destroying the function of the muscles.

Extending over a period of forty years, we have read from time to time of devices—plates, et cetera —used to prevent the tongue from interfering with the newly approximated surfaces of the palate.

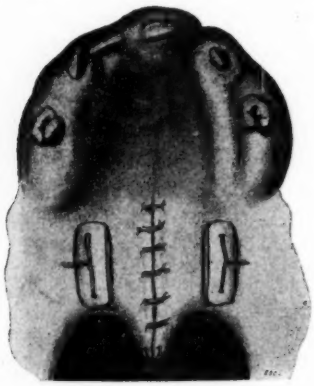


Fig. 10. Lead plates in position. They must be free from sharp corners and edges, and the wires not too tight lest the tissues be cut.

Their use, however, has been transient. The wires with which the lead plates are fixed are bent down in such a way that they do not lacerate the tongue but make contact of the tongue with them uncomfortable, thus avoiding disturbance of the palate.

It is the duty of the surgeon to see that the plates are properly adjusted. If they are not properly adjusted, if they are made too tight, if they are so placed that they will cut the tisues, failure is likely to follow.

The palate demands thorough cleanliness. Only by daily observation on the part of the surgeon and cleanliness on the part of the nurse, may the highest degree of success in treating cleft palate be achieved.

CONCLUSIONS

There are no operations in the whole broad field of surgery in which so large a percentage of failures occur as in palatal surgery. It must be remembered that the most careful operator, who has performed a perfect operation, may fail to secure a good result because of specific disease. Moreover, sometimes a most promising case coupled with the greatest care and perfect technic may result in failure on account of conditions beyond the surgeon's control.

The greatest obstacle in the way of success in maxillo-palatal surgery is a lack of knowledge of the correct age for the different steps and the methods of procedure. So long as the majority of medical colleges utterly fail to teach their students this subject just so long will the principles underlying the surgery of the palate be misunderstood and, as in the past, there will continue to be innumerable failures in operations.

Those who operate on cleft palate only occasionally and the uninformed do not realize that maxillo-labio-palatal surgery is a vast field for study and practice. When we see mutilations, such as amputation of the premaxillæ, et cetera, which cannot be too strongly condemned, when we see that many without a knowledge of the fundamentals of the subject are continuing these practices, we feel that all measures available should be employed to stimulate the study of oral surgery and thus avert such calamities.

It must appeal to every surgeon, who logically looks upon the situation, that articles which have appeared in certain text books in the United States, England, France, Spain and some other countries, repeating the writings of authors of hundreds of years ago on the treatment of cleft palate, are antiquated and do not set forth the truths that have been revealed up to this period.

Fig. 11. Upper centrals.

The author of a text book assumes a great and solemn responsibility. Every child who is operated on by a surgeon whose knowledge in treating these cases was acquired by *reading* a text book with such teachings as the excision of the premaxillæ and consequent permanent mutilation of the patient, may well place the responsibility of this procedure at the door of the author.

DISCUSSION

DR. CARL W. WALDRON: It has certainly been a great privilege to be here tonight and hear Dr. Brophy give his experience during what is more than the span of lifetime of most of us here, an experience that has been fraught with many disappointments in some ways but yet always increasing and attaining more perfection.

Those of us who have made a study of Dr. Brophy's textbook will realize that tonight he has given us some ideas that are not incorporated in his textbook, particularly with reference to the time of the bone operation. I think eight or ten years ago Dr. Brophy was far more anxious to operate within the first week of life of the tiny infant than he is today. He has learned from experience that there is developed with the alveolar process greater protection of the developing teeth by waiting for a certain period of time, but not waiting too long; not waiting until the time when the process of molding, digital molding of the bones is made difficult by ossification.

This is one detail we might discuss for a minute—this matter of molding. Some of the observers, particularly Thompson, of Galveston, lay particular stress on this feature: during the operative procedure on the alveolar process, time should be taken; not too much hurry to insert wires, for instance. Take plenty of time to do what he calls digital molding, using plenty of firm, re-applied force to approximate the separated bony processes, and then hold them with the wires rather than to use the wires as a means of drawing them together. I think this is an important point. I feel that it has been so in my own practice. In taking care of these patients I take plenty of time to bring the parts together as well as possible with firm pressure of the thumbs. I might state that in my own experience the very process sometimes tires me out. My hands will ache for some time afterwards; it is somewhat difficult.

Dr. Brophy's emphasis of the importance of bony contact and immobilization is well taken. I feel that it is an important part of the operative procedure. There is one thing that might be mentioned and that is that I feel most anatomists agree that the smaller fragment in a unilateral cleft is in a relatively normal position as far as its lateral position is concerned, the displacement being an upward one of the palatal process. So in molding we must pay particular attention to the larger fragment to bring it over and approximate it to the smaller fragment and then hold it with the wiring.

I would like to ask Dr. Brophy one question with reference to bony union. Those of you who have read some of Dr. Ritchie's articles on this subject—and we are sorry that he is not here tonight because we would like to have him present his ideas on the question of preliminary lip closure—Dr. Ritchie says he has yet to see evidence of bony union as shown by the *x*-ray. I would like to ask Dr. Brophy if he has made any systematic record postoperatively, that is, three or four years after operation, of the presence of bony union by the use of dental films and careful *x*-ray studies.

There is another thing: this question of the single wire. I think if we are looking upon our wires as a means of approximation that the single wiring without the use of plates should be condemned; whereas if we carry out, as I described previously, the careful molding, in many cases a single wire if placed sufficiently posteriorly from the anterior cleft will suffice. I am sure that many men are getting excellent results by such a method. This problem of the spreading of the tuberosities also hinges upon the question of the placement of the wire and somewhat on the preliminary molding. I feel that it will not take place if the molding has been done very carefully and the wires are put in carefully.

Now we have the problem of the soft palate—Dr. Brophy feels that the lead plates are essential in so far as the control of tension is concerned. I think Dr. Ritchie has added to our knowledge in the handling of the muscle problem in the lip and palate operations by his careful denudation, not by cutting away muscle but by a wide exposure of muscle fibers and the use of muscle sutures. I believe that to date he has had no muscle separation and no separation of the soft palate following operation. He has not to my knowledge resorted to the use of plates.

There is one important point in connection with the closure of the hard palate and that is that measurements should be taken. We should estimate for instance the distance from the alveolar process to the alveolar process just anterior to the position of the tuberosity, and then measure again the widths from that point to the margin of the cleft and determine whether there is sufficient tissue. If it is not there, wait for it to grow. We must figure that it is better in these cases to wait a year and if necessary make more extensive use of all our aids in the training of speech, and at the same time be sure of a closure; rather than to operate before for instance the fifteenth or sixteenth month of age and take a chance on the closure. It is much better, I feel, to wait for another year perhaps until we know by our measurements—say the measurements of a plaster cast that we can make from an impression—that we have sufficient tissue and can at least expect a closure at perhaps two operations, if not successful at the first attempt.

The question of the operative closure of the recurrent perforations was not taken up by Dr. Brophy. I feel that the delayed flap, which is a modification of the flaps we used a great deal in war surgery, is an advance in the hazardous undertaking of closing some of these recurrent perforations where the blood supply is not as perfect as we might hope.

I would like to ask Dr. Brophy where the special nipples may be obtained for use in feeding these posterior cleft cases, while waiting a year or two for the time for the operative closure to be performed.

In closing I want to again thank Dr. Brophy for the treat he has given us tonight and to assure him that when I go to Chicago I shall always call on him to see the good work he is doing.

DR. R. E. FARR: I would hardly have the temerity to discuss this subject in the presence of Dr. Brophy excepting that I wish to add a word regarding my esteem for Dr. Brophy and the work he has done. My notion for many years has been that cleft palate surgery began with Brophy and ended with Brophy. My feeling is that twenty or perhaps fifty years from now the work that Dr. Brophy has done will be much more appreciated than it is at the present time.

My experience is limited and yet a large percentage of the cases that have come to me have been operated upon by methods which Dr. Brophy does not and never has advocated. Generally these patients have been operated upon by the preliminary closure of the lip. Several years ago I showed four pictures of children from eight to twenty years of age with the forefinger of each lying in the cleft between

the bones, and these children had all had the lip closed within the first three months.

The whole question before us is: shall we repose the bone or not? This picture tells the story. Here is a photograph of a little baby before the wiring. A line down the center of the face cuts the ala on the side of the cleft about at the midpoint, that is, three-quarters of the way between one ala and the other. There is three-quarters of the nose on one side and one-quarter on the other. After the wiring, in every case in which we have been successful we have had an absolutely symmetrical face as shown in the next slide.

For many, many years Dr. Brophy has been kind enough to show me every detail of this operation. The only objection to it that I have is that it is more difficult in most people's hands than it is in the hands of Dr. Brophy. We have trouble with our anesthesia. We have difficulty in getting our landmarks, getting our wires high enough and far enough back. I think we too often tilt the bones.

This is the first time I have ever seen Dr. Brophy have time enough at a meeting to discuss the subject fully. I have not been where he has been the guest of honor like this, where he had the whole meeting and where he could discuss all of the points. I am certain that if his message takes root in this audience and his enthusiasm is transmitted to us he is going to save a great many children in the future from carrying these defects through life. Of course Dr. Brophy cannot do all of these operations. I wish to goodness he could. In regard to that last picture he put on the screen in which the lips had been stretched to such an enormous size I would suggest that a "lipectomy" be performed.

DR. BROPHY (closing): Replying to Dr. Waldron, I no longer operate upon patients a few days old and for the reasons he gives. The child should live long enough before operation to have all organs functioning well. I depend upon a pediatrician to get the child into proper condition.

I did not hear anyone state what other method could be used in the case taken from James Barry in order to close the cleft. Isn't it proper to bring the bones into normal position? I do not agree with Dr. Waldron that a single wire will accomplish the reposition of the bones. It will not hold the tuberosities in position and we know that the soft palate cannot be depended upon to do so. I should like to ask Dr. Waldron if, in his work, or that of Dr. Ritchie, where the anterior closure alone had been made, the soft palate after operation was long enough to reach the post-pharyngeal wall. If it is not the patient will not speak well.

The most eloquent answer that can be made to the question brought up by Dr. Waldron regarding whether or not bony union takes place may be had by referring to Figure 11. It is so certain that bony union does take place that I have never heretofore thought it necessary to offer concrete evidence. If it was necessary, thousands of such cases could be presented.

Dr. Farr has spoken kindly about the work I have been doing. I have simply tried to be conscientious and do the right thing and yet I have been criticised a great deal and some of my friends think that I should be in jail.

In conclusion, I feel certain that the man who makes a success of this work, bringing about a condition which will enable patients to go through life with the nose in the center of the face, a completely closed cleft and articulating distinctly, will not do it by using a single wire in the front. Personal appearance and function are the essentials. I am not particular how you obtain the results but have tried to show a method of meeting the indications. It is a notorious fact that cleft palate cases, the world over, usually fail to receive efficient treatment.

THE NEED

One newspaper is quoted as stating that the most important happening in this country last year was the birth of 2,000,000 children.

How many of them lived? This is not known accurately, because there remain eighteen states which do not yet register their births! Of the thirty states in this country within the Registration area, one child in every thirteen born dies during its first year. If the same ratio applies to the states which do not register, we have a total loss of 190,000 American children a year.

That is startling, but it is a long way from the day when parents were considered fortunate if they were able to bring up two out of every three of their children.

Still, it leaves us behind five other nations, including New Zealand, the best off of all countries which keep books on their greatest asset, which loses only one in twenty of its children during the first year.

But there are things almost as bad as death. There are children unfitted or not half fitted for life. And there are hordes of them just enough handicapped physically or mentally to be drawn into the ranks of those who may labor long but receive little happiness or substance.

Here are some of the handicaps: The figures may be taken as approximately correct:

Studies made in many communities indicate that millions of American school children suffer from malnutrition or physical defects, most of which can be prevented and many of which can be corrected.

They range from seventy-five per cent with dental defects to one-half of one per cent with organic heart trouble, in between coming those with tuberculosis, defects of vision, etc.

Then, as to mothers:

According to the United States Census Bureau, 17,800 women in the United States of America died from conditions caused by childbirth in 1919. In 1920 the rate rose to eight per cent. Italy, crowded as she is, has a rate of only five per cent lost mothers.

Sixteen nations save more mothers than we do.

To focus attention upon the above facts, without at the same time attempting to indicate some of the ways out, would be of little service. May Day, which is celebrated by children in many communities, perhaps offers the best opportunity to combine incentives to increased outdoor life for children with efforts toward a knowledge of what to do next in Child Health and Child Health Education.

FACTORS OF SAFETY IN GASTRIC SURGERY*

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The general principles of surgical treatment are more or less established, but the results of the application of these principles vary considerably in the hands of different surgeons. Operative mortality is always the first question in the mind of the patient to whom operation is advised, and, while it is of secondary importance in certain life-saving emergency operations and in malignant disease, it is of first importance to both patient and surgeon in operations of election. Remarkably low operative mortality rates are now possible in various fields of major surgery, even when the surgeon accepts his full responsibility and does not sacrifice the interests of the patient to a desire for low operative mortality records.

In surgery of the stomach and duodenum, the question of operative mortality is one of supreme importance because of the frequency of non-malignant conditions, such as duodenal ulcer, in which operation is carried out to relieve serious symptoms and not to save life, except in the occasional case. The safety with which operation for such conditions can be performed is shown by Moynihan, who reports nearly 600 consecutive gastro-enterostomies for chronic duodenal ulcer without a death. It is important, therefore, that surgeons keep such achievements in mind and become thoroughly familiar with the factors of safety which make such accomplishments possible.

The first factor of safety is concerned with the indications for operation, the risk which the operation entails, and the measures which may be employed to lessen the risk. In non-malignant surgical lesions of the stomach (chronic ulcer) the advisability of operation is usually clear, and comparatively rarely do real contraindications exist. Experience has shown that all chronic gastric ulcers should be operated on without unnecessary delay, because the risk of operation, which should not be greater than between 2 and 3 per cent, is insignificant compared to the danger of a permanent disability,—a disability which not infrequently progresses to a fatal outcome. In the few cases in which operation was not advised, other conditions such as tuberculosis, nephritis, or cardiac disease, were so advanced as to prohibit an operation of election, and surgical treatment was postponed in the hope that the patient's condition might sufficiently improve, under treatment, to permit operation for the ulcer later with a reasonable degree of safety. In duodenal ulcer, neither the disability nor the danger of serious outcome is sufficient to warrant advising operation with the same emphasis as in gastric ulcer. Nevertheless, experience has again shown that the low risk of operation, 1 + per cent, and the excellent results of surgical treatment properly carried out leave no justification for non-surgical measures ineffectively prolonged. Complications such as hemorrhage, perforation (acute and chronic), obstruction, and malignant degeneration remove any doubt that may exist as to the necessity of operation. Because duodenal ulcer is a much less serious condition than gastric ulcer, factors which would have little or no weight in considering the advisability of operation in gastric ulcer attain considerable importance when duodenal ulcer is present. Consequently, contraindications to operation are seldom found in gastric ulcer, while in duodenal ulcer it is not uncommon to find that the circumstances justify postponement of operation. Various reasons are noted for advising against, or postponing, operation in cases of duodenal ulcer, such as extremes in age, short history, mild attacks at long intervals, positive *x*-ray findings without symptoms, marked obesity, serious cardiac, pulmonary, or renal disease (the ulcer being only an incidental finding), and the occupation of the patient. Selection of cases, therefore, is based not only on the operative risk, but on the severity of the symptoms and whether they respond sufficiently to medical management to keep the patient comfortable and self-supporting.

In malignant lesions (carcinoma) an entirely different problem exists, because the only hope of saving the life of the patient is by operation. Risks which would be quite unjustifiable in cases of non-malignant gastric lesions become justifiable in cases of malignant lesions. The surgeon, with increasing experience, is led to accept greater and greater risks in cases of gastric malignancy, because of the hopelessness of the disease without surgery, and because he is able to recall unexpected successes in cases in which there appeared to be little or no chance to remove the growth. As a consequence, it is difficult to keep the operative

*Read before the Annual Meeting of the Minnesota State Medical Association, St. Paul, October 10-12, 1923.

mortality of gastric resection for carcinoma under 10 per cent, and the mortality rate could probably be reduced one-half, if only patients in good condition and with moderately advanced lesions were accepted for operation. In cases of cancer of the stomach, unless the disease is obviously incurable because of metastasis, the conscientious surgeon must, to a considerable extent, follow the wish of the patient, a practice which does not contribute to a low mortality rate. Although radical operation is seldom indicated if there is metastasis, it should be noted that patients may live three or even five years after the removal of cancer of the stomach, which is already associated with metastasis to the liver.

A decision as to the advisability of exploration in cancer of the stomach has been greatly simplified by the radiologic examination. In the Clinic, Carman and his associates have graded gastric malignancy into three groups: (1) operable, (2) questionably operable, (3) inoperable. Of the operable cases, 50 per cent, so far as the growth was concerned, were found to be suitable for resection; of the questionably operable, 18 per cent; and of the few inoperable cases in which exploration was performed, 12 per cent were resected.

Patients with peptic ulcer do not, as a rule, require elaborate or prolonged preoperative preparation. If the condition is uncomplicated and the patient is in good general health, operation may be carried out without delay. If complications exist, or have existed, preoperative preparation will be instituted according to the nature of the complication. Obstruction at any point in the stomach sufficient to cause a retention of 300 c.c. necessitates gastric lavage, repeated for several days until the washings are clear; the stomach is thus kept clean up to the time of operation. The administration of barium for fluoroscopic examination is to be avoided in all cases in which gastric retention is shown by the history or by the test meal. Water should be given routinely in cases of obstruction, the amount varying with the degree of dehydration. Patients with marked anemia due to recent or recurring hemorrhages should be put to bed, a bland diet established, and transfusions given until the hemoglobin has been raised to 50 per cent, if possible. When the patient ceases to respond to transfusion, even though his condition is not so good as is desired, further delay is useless and inadvisable. Operation during gastric hemorrhage should usually be avoided, not only because of the added risk, but because such hemorrhage may occur in the absence of any recognizable mucosal defects and under circumstances which strongly suggest ulceration. Recovery is the rule following a single attack of hematemesis, and the exceptions to the rule would not have been saved by emergency surgery. The best practice in cases of gastric hemorrhage is to keep the patient under observation until recovery from the effects of the hemorrhage has progressed to its maximal point, or at least to a point at which operation can be carried out with reasonable safety. If the patient is recovering from the effects of one hemorrhage and another gross hemorrhage occurs, or if he is losing ground because of continuous oozing, and an ulcer is known to be present, transfusion, followed immediately by operation, is advisable. The recent publications of Finsterer, showing the results of operation for gastric hemorrhage, deserve careful consideration, and may ultimately modify our present views.

The anemia associated with gastric malignancy does not often respond satisfactorily to transfusion, and little or no benefit may be expected from it. Severe anemia in gastric carcinoma is an unfavorable sign, particularly when associated with edema. The preparation of the patient who has cancer of the stomach consists chiefly in restoration of fluids, cleansing the obstructed stomach, and limited rest, but no marked improvement can be expected from preoperative treatment, so that its prolongation is unnecessary and unwise.

The chief factors of safety are in the conduct of the operation itself. The question of the anesthetic arises first. It is difficult to prove by statistics the relative value of the various anesthetics. In the Mayo Clinic, local anesthetic does not appear according to statistics to be a safer anesthetic than ether, but comparison by statistics is unfair because local anesthetic is usually employed for the poor surgical risks, and ether for the good surgical risks. It is, therefore, true that the operative mortality under such practice is higher with local than with general anesthesia. There is no doubt, however, that local anesthesia, combined if necessary with a small amount of general anesthesia, is of less risk to the patient, and especially to the patient in poor condition. The early reports concerning the new anesthetic, ethylene, and our own experience with it, indicate that a step forward has been taken in the field of anesthesia.

The first rule of safety is that the operation should be completed as expeditiously as is consistent with careful work. Speed should not be carried to excess, nor should care in detail reach the point of fussiness. One of the characteristics of the good surgeon is that he does not underrate the relative importance of time and attention to detail, particularly hemostasis. Gastro-enterostomy, in the uncomplicated case, can be properly performed in twenty minutes, and partial gastrectomy can be performed in little more than half an hour.

The next factor to insure safety is the selection of the operative procedure best suited to the lesion. Operative mortality, or more often postoperative morbidity, can often be attributed to failure to make the proper selection. The best results in gastric surgery will be attained by the surgeon who is not only familiar with the indications for the various operations, but is capable of properly carrying them out. As illustrations of wrong selection of operation, one may cite: forcing a posterior gastro-enterostomy when adhesions obliterate the lesser sac of peritoneum, or fix the first loop of jejunum; mobilizing a pyloric or duodenal ulcer which has perforated and become adherent to the liver; failing to free an ulcer which has perforated posteriorly and become adherent to the pancreas; neglecting to excise the ulcer which has been associated with hemorrhage; failing to resect the large ulcer which is, or probably will become, malignant; and partial gastrectomy for malignancy so advanced that the diseased tissue cannot be entirely removed. Such errors may be made because of poor judgment, but mistakes such as anastomosing the stomach with the transverse colon or with the terminal ileum, are examples of errors due to ignorance or inexperience, or both.

Having selected the operation best suited to the particular lesion, the next and most important factor of safety is its proper performance. Any operation on the stomach should be so performed that gastro-intestinal function is well preserved. The fundamental principle in the surgical treatment of ulcer is adequate drainage. Whatever anastomosis is made, therefore, should be large, properly placed, and protected against subsequent interference in its function. A small anastomosis invites failure to secure for the patient the symptomatic relief he should expect, and not infrequently requires secondary operation. An anastomosis which is not at the most dependent part of the stomach does not provide the best drainage, and is at least relatively inefficient. To prevent subsequent contraction of the anastomosis, it must be free; hence all anastomoses should be made through a wide opening in the mesocolon, and the opening in the latter closed by suturing its edges to the stomach in such a way that the anastomosis hangs well below the opening in the mesocolon. In cases of gastrojejunal ulcer, it is common to find the mesocolon fixed to the line of anastomosis, suggesting that such a relationship was a factor in the occurrence of the secondary ulceration. Of great importance from the standpoint of both safety and good results is the avoidance of tension. A gastro-enterostomy may fail because of too short a proximal loop, and a suture line may give way after an extensive resection because tension on the line of anastomosis has not been relieved by reinforcing sutures, or because some other method of restoring gastro-intestinal continuity would have been preferable.

Another most essential factor of safety concerns the control of hemorrhage. Postoperative hemorrhage after operations on the stomach may occur, but there is no doubt that serious bleeding from suture lines is unnecessary, and when it does take place from a cut edge of the stomach or intestine, the surgeon must accept the fact that it could have been prevented. If clamps are used, they should be loosened after the first row of sutures is placed posteriorly, and all vessels that can be caught and ligated are so dealt with. The anastomosing suture should be held taut and carefully placed without too much tissue intervening between the stitches, and, in regard to the latter point, especial care should be taken at each end of the anastomosis where it is occasionally a temptation to invert an excess of stomach or jejunal edge with one stitch. Postoperative hemorrhage may and does take place from an unremoved ulcer, and may be sufficient to cause death, but such cases are exceedingly rare; I have seen one in several hundred operations for ulcer. The surgeon should be able to feel certain, from the care he has taken in performing the anastomosis, that any postoperative bleeding is not from the suture line. Finally, the control of sepsis as a factor of safety is of relatively less importance, because infection from the contents of the stomach, duodenum, or upper jejunum is not likely. Nevertheless, it is significant that those who report the best results in gastric surgery are the most careful

in walling off the operative field by suitably arranged pads.

POSTOPERATIVE MANAGEMENT

The care of the patient after operation on the stomach or duodenum is first directed toward the prevention of pulmonary complications. Mortality after gastric surgery is usually due, directly or indirectly, to chest complications. Chilling of the body surface should be guarded against during and following the operation. Particular care should be exercised in moving patients from an overheated operating room, through draughty halls, and into a room where the temperature is several degrees lower than in the operating room. Pneumonia, due to aspiration of mucus, or vomiting during recovery from the anesthetic, is a real danger that can usually be avoided by strict postoperative attention. Fluids by rectum should be given routinely, and in serious risks should be augmented by hypodermoclysis. Fluids by mouth may be given twelve hours after operation in the ordinary case, but recent experience in providing absolute rest for the stomach by allowing nothing by mouth for a period of four or five days after operation, with the judicious use of morphin, has led us to adopt the practice. Undoubtedly, the convalescence is now easier than under former methods of treatment, at least following more extensive operations on the gastro-intestinal tract. This is especially true after extensive resections, where only a small portion of stomach remains, the distension of which by too much fluid would place a dangerous strain on the suture line.

Acute dilatation of the stomach, a serious postoperative complication if neglected, is promptly relieved by the use of the stomach tube. There should be no hesitation in passing the tube if there is any suspicion that an acute dilatation exists, and this may only show itself in a rapid pulse. If gastric retention occurs during convalescence, due to poor motility, the stomach should be emptied and kept so until it has regained its tone.

If oozing takes place into the stomach, gastric lavage with water of 120° is by far the most efficacious measure, and without danger if carefully carried out. Removing partially coagulated blood from the stomach enables it to contract so that normal clotting in capillaries of the mucous membrane may more easily occur. Such lavage may be repeated as necessary. Should obstruction at the anastomosis occur and not respond to lavage, prompt entero-anastomosis should be performed. In any complication which may arise during convalescence, the earlier its recognition and the more prompt its treatment, the more successful is its control.

DISCUSSION

Dr. A. C. Strachauer, Minneapolis: The consideration of the factors of safety in surgery is always very important and particularly so in the field of gastric surgery because gastric surgery is really major surgery. Then, again, due to the better results being obtained gastric surgery is increasing in quantity. The stomach operation has become of very frequent occurrence.

In my own practice I consider the pre-operative care and preparation of the patient of the very greatest importance; in fact, as important as the pre-operative preparation of the case for prostatectomy. This is not generally appreciated. I do not alone refer to the obstructed patient who is dehydrated, starving and on the verge of acidosis, but to the ordinary routine case of ulcer of the stomach or duodenum. It is a mistake to operate upon ulcers which are active, which phase may be appropriately termed a crisis. While the ambulatory treatment at times suffices, these people should usually be put to bed, preferably under the direction of a gastroenterologist or medical practitioner, and placed on an ulcer management regime. Response to any of the standard medical ulcer treatments is usually very prompt, and in a varying period of time the ulcer becomes inactive. Many active ulcers which are non-resectible, due to the surrounding area of infection and inflammation, when inactivated become safely resectible. The medical treatment also builds the patient up generally, with increase of resistance. The eradication of the ulcer not only greatly increases the percentage of cures, but protects the patient against the occurrence of hemorrhage, perforation and malignant degeneration. As a matter of fact the microscopic examination of simple benign ulcers every now and then shows the same to have been malignant. The post-operative morbidity of gastroenterostomy is in a large measure due to the mechanical activation of the ulcer due to manipulation and traumatization at the time of the operation. This is obviated by gentle handling of the structures and by resection of the ulcer whenever possible. I find that we are resorting more and more to transfusion in the preparation of our patients, not alone in the cases with hemoglobin below 30 per cent but in the individual with hemoglobin of 60 per cent or more who has the appearance of being asthenic. The latter patient is transfused so that he may receive the benefit of the "kick" that is contained in the transfusion and so withstand the operation better. All patients scheduled for major gastric interference are grouped for transfusion whether they require the same or not.

Employment of the trap door incision, that is, a combination of the transverse and the longitudinal incisions, giving the most ample exposure possible, is, in my opinion, a factor of safety in gastric surgery, particularly in attacking ulcers high up on the lesser curvature.

Dr. Balfour refers to pneumonia as a factor in carrying off these patients. I believe that the routine practice of

having the patients sit up with a back rest on the first day after the operation, or even on the day of the operation, is an important aid in decreasing the incidence of pneumonia.

Dr. Balfour has given this subject thorough consideration, and there is no occasion for my going over and enumerating all the various factors which he has so well called to your attention and sufficiently emphasized.

DR. ARNOLD SCHWYZER, St. Paul: When one hears this paper one feels that here a man of experience sits up and thinks: "What is really now the most important in all this gastric surgery? What can still improve the already splendid results?" As Dr. Strachauer says, there are so many things mentioned in this paper that one cannot go through them all; one can only emphasize a few. For instance, the value the Doctor laid on resecting gastric ulcers. That was brought home to me in a very vivid way in a recent case where we resected. Now I thought I had experience in judging pathological conditions. When I cut that resected piece open, I said: Here are two beautiful, fine, round ulcers, as classical as they can be, one with a diameter of a centimeter, the other considerably smaller. But when we cut through them, we became a little suspicious. The larger one was showing a little thicker base than we were used to seeing and microscopically it was a very plain carcinoma. That shows the good judgment in resecting all those cases of gastric ulcer.

The Doctor said in his paper that if a bad hemorrhage occurs after the operation, we have to consider ourselves guilty. I think in suturing with the continuous suture if one goes around the larger vessels, makes a loop around them, he can do much in preventing that.

In bleeding before the operation—I again can only emphasize what he said, that is, when it is necessary or desirable to transfuse, to do the operation immediately afterward; in fact, to leave the patient on the table and proceed to operate has seemed to me the most desirable. Especially those cases of small, continued, or frequently repeated bleeding, where even with a strictest diet we do not get stopping of the bleeding—I think with those we should not wait long before we go at them.

About the short loop operation the Doctor has mentioned—it always strikes me that there the main cause of trouble is the pulling of the no loop end, that is, the distal end. We then really stretch the anastomosis opening so that the upper end is the direct channel. I have long used a device to counteract vicious circle. When you make your gastroenterostomy, you make the outlet free if you make the sutures grasp a broader surface toward the upper end. With these wider sutures, you constrict the inlet, get a better and broader union at the upper end and produce a little kinking off of your inlet.

About postoperative pneumonia and respiratory difficulties. It is painful to hear the patients under ether in some hospitals—the noise they make with the mucus in the trachea. That of course is awful. The local anesthesia in gastric surgery is, as the Doctor said, a distinct step ahead, especially if we do not insist too much on it but use it with perhaps at times some ether. After the operation very often those patients fill up and then I have felt that it was a great help to use a little trick. I come into a sick room and I see the patient would like to cough but he does not dare to cough on account of pain and he cannot cough. The only way to help these people is if I get a good hold of them on the sides of the abdomen near the field of operation, and ask them to cough. When they cough I press hard so that at the same time I not only help them to cough, but that relaxes the stitches and they can cough with hardly any pain. I have very often gotten out large masses of phlegm that they had there for hours and could not get rid of. I think I have saved the life of at least one patient by this. The nurse is instructed how to hold and how hard to press at the moment of coughing.

DR. WILLIAM J. MAYO, Rochester: I would like to speak of two points that were brought up in Dr. Balfour's paper: In case of a severe hemorrhage from ulcer, I think it is not wise to operate immediately following the first hemorrhage, since, if patients die from acute hemorrhages, they do not die usually until they have had the third hemorrhage. This was pointed out in the old pre-antiseptic days with regard to the secondary hemorrhages from infected thrombi. If, therefore, the patient has but one hemorrhage, I think it wise to wait. If they have a second hemorrhage as severe or approaching the severity of the first, I believe it is wise to transfuse, as Dr. Schwyzer says, on the table, and to operate at once. In operating there is only one thing to do, that is, open freely at the site of the ulcer and find the bleeding point. Gastro-enterostomy, as a rule, will not avail. The hemorrhage will usually be found coming from a short, straight blood vessel in the posterior wall, often in pancreatic tissue. About one ulcer in eight that bleeds before operation will bleed after operation. These are very trying cases. The rule now is that if patients relapse several times, it is wise to resect the pyloric end of the stomach, where the ulcer starts either on the duodenum or on the stomach.

We have been quoted a great deal with regard to the question of cancer on ulcer. Our experience is based, not on all patients that come to the Clinic with cancer of the stomach, but on the patients that are actually operated on for cancer of the stomach. We have been quoted as saying that 71 per cent of cancers of the stomach had their origin in ulcer. I doubt whether even 25 per cent of cancer of the stomach observed consecutively could be actually shown to have their origin in ulcer, but that ulcer of the stomach is a serious disease and more serious than ulcer of the duodenum, and that it often precedes cancer, we cannot doubt. The great life insurance companies were anxious to know whether patients on whom operation had been performed for ulcer of the stomach and duodenum were insurable, and Mr. Hunter, the Vice President of the New York Life Insurance Company, came to our Clinic and with his own actuaries investigated the records of about three thousand patients who had been operated on for ulcer of the stomach and duodenum. Then through the medical examiners of the life insurance companies, these patients were traced, and as far as possible examined; thus accurate data were obtained concerning the actual results. They were able to trace about 90 per cent of the patients, and found that five years after operation on the duodenum for peptic ulcer the death rate was, if anything,

less than that among the average insurable persons of the same age. The death rate five years after operation for ulcer of the stomach was two and a half times the normal death rate at the same period of the average insurable persons.

DR. THEO. BRATRUD, Warren: Dr. Balfour's paper could not of course cover the whole field of gastric surgery. There is one type of gastric surgery which I wish to comment upon. That is an acute perforation of the stomach or duodenum. We have had several consecutive cases without a death. In every one of these cases we performed a jejunostomy and closed the perforation. As I understand it, there is a great deal of dispute as to whether a gastroenterostomy should be done in an acute perforation or not. When jejunostomy is done you can pour in a pint of water into the bowel right on the operating table; or you can start feeding them the next day with milk and glucose and whipped eggs. And another nice thing about the jejunostomy in these acute perforations is that they have no distension of the stomach, and very few of them have to have any postoperative treatment for gas distension.

We had trouble with two out of nine cases where we did a jejunostomy in acute perforation. One had a gastroenterostomy about a year after his perforation, and the other one had quite a severe hemorrhage from the stomach. Another case on which we did a jejunostomy for acute perforation had had a gastrotenterostomy some twenty years before for duodenal ulcer. At the time of the operation we found a large duodenal ulcer right under the pelvis of the gall bladder. We found the gastroenterostomy functioning properly, in perfect condition. This man was sixty-five years old. His convalescence was perfect.

I think the Doctor called attention to the large ulcer on the lesser curvature. We had one case with a high ulcer that we used the Balfour cautery and found so wide an ulcer after exposing that a sleeve resection seemed necessary and I presume that is what Dr. Mayo would have done under the circumstances. The man was not in very good condition, and we did a jejunostomy and we fed him through a tube for six weeks. He gained a great deal in weight. He had suffered so much pain prior to his operation that we were afraid of operating on him—we had examined him very thoroughly—for fear he had some spinal tumor on account of his severe pain. But this man was so satisfied with the tube that he was unwilling to have the ulcer removed when we took the tube out. He has gotten along nicely now for two years.

DR. A. C. STRACHAUER, Minneapolis: I am very glad that Dr. Bratrud brought up the question of the surgery of the perforated gastric ulcer. I must say that a great deal of harm has been done by the teaching in which gastroenterostomy is recommended routinely in cases of perforated gastric ulcer, particularly in the hands of the general practitioner and in the hands of surgeons of limited experience working under situations and circumstances that are not the most auspicious for the performance of gastric surgery. I want to go even one step farther than Dr. Bratrud, my opinion being based particularly on two cases that I had the opportunity to come in contact with this last year. First, let me say that the indication as far as surgery is concerned in the perforated ulcer is to "get in and get out." It is my own practice simply to close the ulcer, resecting the margin if necessary to get a good closure. But anyone with experience in a perforated gastric ulcer knows how extremely difficult it may be to suture the wall of the stomach beyond the ulcer. It is inflamed; it is infected. Sutures do not hold; they pull through just like through cheese.

This last year I had the satisfaction of seeing two cases, operated upon out in the smaller towns, in which the general practitioner had the good judgment to open the belly, stick a rubber tube in the perforation opening in the stomach, put in a stitch or two, and close the belly and be satisfied with it. The thing to do is to get in and get out. Do not do too much. I know to my own satisfaction that it is unnecessary to perform the gastroenterostomy.

DR. DONALD C. BALFOUR, Rochester (closing): I appreciate very much the discussion of this paper. One of the points deserving emphasis was that made by Dr. Strachauer regarding the inadvisability of operating on patients with gastric ulcers when they are very ill, that is, when they are going through an acute exacerbation of symptoms. The remarks that Dr. Schwyzer made about the resection of ulcers could also be especially emphasized. Certainly, the nearer one can approach a routine resection of a gastric ulcer, the better will be the results. Dr. Schwyzer also has drawn attention to the necessity of avoiding tension on the suture line and described his simple method of doing so.

I might supplement what Dr. Mayo said about the study made by the Actuarial Society to this extent: the first thing that comes to one's mind when he learns the result of this study is, "What was the cause of death in patients who died following operation for gastric ulcer?" As Dr. Mayo said, the patient who has been operated on for duodenal ulcer was shown by actual figures to have a little longer expectation of life than one of similar age and sex in the general population group, and in gastric ulcers the subsequent death rate was about two and a half times as much.

I took occasion, when this report came out, to investigate as well as I could the cause of death in the latter group, and it was astonishing to learn of the number of patients who had died of cancer afterwards. And then as you review the operative records of those patients who had died of cancer, you will find that a large proportion had had only a gastroenterostomy done for a large, irremovable lesion, presumably gastric ulcer. The lesion was usually attached to the pancreas, and the surgeon felt that it was not possible, or not feasible, to attempt to get a section of it. Those patients did well for a few months, then began to lose ground, and a report came within one or two years that they had died of cancer. It is reasonable to suppose that they had cancer at the time they were operated upon. If one eliminates that group from the entire group of patients who have died after operation for gastric ulcer, he will find that the expectation of life is very much better than was found by the Actuarial Society.

I would also like to add my compliments to Dr. Bratrud for that excellent suggestion of jejunostomy in the treatment of perforated gastric ulcers.

SOME PHASES OF THE GLAUCOMA PROBLEM*

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The observation that the condition of glaucoma is so frequently overlooked not only by the general practitioner, but also by men professing to practice ophthalmology, and even when recognized or suspected, is so frequently neglected or imperfectly treated, has prompted me to offer a few remarks on this subject that has been such a favorite theme for study and writing of ophthalmologists.

There is so much to say on such an important topic and all that is known of it has been presented in the literature so much more ably than I can hope to do, that it is with some hesitation that I venture to offer it as the subject of a paper that your chairman has dignified on the program as an address.

It is only because of the hope that some observations on the subject that have been impressed upon me after considerable study of such cases and experience in their treatment, may stimulate some of the younger men to more careful study and examination of this really difficult subject, that I feel justified in presenting it before your society.

In considering the subject of glaucoma we should get away from the idea that has so long obtained and that is still held in most text-books, that we are dealing with a disease entity.

While glaucoma is indicative of an abnormal condition of the eye, it is more accurately a syndrome, a symptom complex, the chief feature of which is intra-ocular pressure.

The accumulated experience and observation of many students of this subject demonstrate the complexity of the pathologic condition that may underlie glaucoma.

The division into inflammatory and non-inflammatory, acute, sub-acute and chronic or simple forms is the natural sequel of considering the condition as a disease *per se*, and is confusing. Much to be preferred is the simpler nomenclature of congestive and non-congestive forms adopted by Elliot and other writers on the subject. Non-congestive forms, as we know, may, under favorable conditions, become congestive.

Hypertension, increased intra-ocular pressure, is universally recognized as the dominant feature of this condition and the one that demands our closest attention in the study and treatment, but underlying this may exist pathologic changes and conditions so diverse and complex as to defy our efforts to elucidate them.

PROBLEMS OF ETIOLOGY

In the study of the etiology of glaucoma we are confronted with difficulties from the outset. A knowledge of Pathological Anatomy assists in the study of pathogenesis. In this subject, the lack of material for studying the earliest stages of glaucoma increases our difficulties. Most of the glaucomatous eyes that come to section are those in the latest stages, and we are not warranted in concluding that these conditions found are those of cause and not of effect.

I assume we are all familiar with most of these changes or at least with the most prominent ones.

The shallow anterior chamber, the filtration angle blocked by the root of the iris, the atrophied iris, the swollen ciliary processes, edematous cornea, the engorged ciliary vessels, the cupped optic disc, the cavernous atrophy of the optic nerve, all these and more have been accurately and carefully observed. But it is difficult to answer the question: "Are these the cause or the effect of the increased intra-ocular pressure?"

There is little doubt that age is an important factor in the etiology. It is a common observation that most cases of glaucoma occur in middle and late life, and statistics confirm this.

For instance, in the analysis of a series of 1,032 cases of primary glaucoma Haag found that four occurred in the first decade of life, 16 in the second, 26 in the third, 74 in the fourth, 176 in the fifth, 288 in the sixth, 329 in the seventh, 116 in the eighth, and three later.

These figures are in accord with the observations of Priestley Smith on a series of 1,000 cases collected from the practice of a number of surgeons.

But in what way does age influence the intra-ocular pressure? Priestley Smith, one of the most profound students of this subject, has shown that the lens grows larger with advancing life while the size of the eyeball remains the same or possibly becomes somewhat smaller. He claims to have demonstrated that the ciliary processes are more

*Read by invitation at the meeting of the Minnesota Academy of Ophthalmology and Oto-laryngology, St. Paul, Minn., Jan. 17, 1924.

prominent and bulky in the old than in the young. With the increase in size of the processes and the lens, the circumlental space is correspondingly narrowed so that fluids cannot so readily pass from the vitreous into the aqueous chamber.

In consequence the lens and swollen ciliary processes are pushed forward against the iris, the root of which blocks the filtration angle and thus impedes or stops the outflow of fluids through the spaces in the pectinate ligament. Of course this would explain the shallow anterior chamber which is one of the well recognized signs of an established glaucoma.

Thickening or sclerosis of the fibers of the pectinate ligaments as pointed out by Henderson may contribute to this result. As a consequence of such thickening, which may be one of the manifestations of fibrosis incident to advancing life, the lymph spaces in this structure may be seriously contracted so as to be inadequate for the circulation of lymph.

Valuable as is the knowledge of these factors in the production of glaucoma, the ultimate cause is not yet known. What brings about the enlargement of the ciliary processes? Is such an enlargement in the nature of an inflammatory condition? Is there associated with it an increased secretion of fluids which the circulatory system of the eye is unable to take care of, thus raising the intra-ocular pressure? If there is an increase of fluids in the eye are they in any way changed in their physical or chemical nature? What rôle do vaso-motor disturbances and nervous irritations, so common in the period of life when glaucoma occurs, play in the problem? Do degenerative changes in the uveal tract, particularly the ciliary body, bring about increased or altered secretions in the eye? What influence do various morbid states that result in auto-intoxication have in bringing about such degenerative changes in the ciliary body?

These and various similar questions are engaging the attention of the students of the subject and have not yet been satisfactorily answered. Possibly they may never be answered, associated as they are with some of the most intricate problems of metabolism.

In truth, the etiology of glaucoma is hydra headed. In the last few years writers on the subject seem to have found reasons for denying any causative relation between arteriosclerosis and glaucoma. One cannot escape the thought, however, that a condition like arteriosclerosis that so profoundly affects the welfare and nutrition of tissues, may play a rôle in bringing about degenerative changes in the eye, particularly if the ocular vessels are so affected, that may lead to the results that we are considering, viz.: hyper-secretion of fluids and alteration of such secretions. Of course, this is, at present, mere speculation.

Appropriate in this connection are the admirable words of the late S. D. Risley on the subject of Etiology: "Glaucoma is a disease, coming on at an age when wear and tear, harassing vicissitudes, misfortunes, exposures, overwork and vicious living have sapped the physiologic foundations of life; when infections have found entrance to the structure of the organism through the doorway of the epithelium; and when a variety of toxic, auto-intoxic and other influences have set up vascular and cardiovascular disease, associated nephritis, uveitis, high blood pressure, etc. Glaucoma, in fact, rarely occurs in individuals in good general health."

DIAGNOSIS

The diagnosis of congestive glaucoma should not be difficult even in the early stages, when we consider the distinct signs that it presents. And yet we can all recall deplorable cases that have been overlooked by the optometrist, and also by the general medical practitioner, in which the eye has been greatly jeopardized or possibly lost in consequence of such an error. Ignorance in regard to this dreaded condition should not exist. General physicians should be impressed with the importance of the early recognition of it, and, although they may do no ophthalmic work, should be able to recognize it, or at least in more insidious cases to suspect it and to refer the case to the specialist for exact diagnosis.

Errors of recognition are not necessarily due to ignorance, but may result from oversight because of the multifarious duties the general practitioner must assume. I recall a recent case under the care of a physician of no mean attainments, which was being treated for persistent vomiting. The eye had distinct congestive glaucoma, but was not painful although the sight was much impaired.

Such experiences are not uncommon and suggest the importance of impressing upon the general physician the necessity of examining the eyes as a part of his general examination of a case. This would be borne home to them if they realized that

at least one per cent of the cases in an eye clinic or in private practice are glaucoma.

No difficulty should be encountered by the specialist in the diagnosis of congestive glaucoma especially if it is once established or is in an acute stage. The signs and symptoms, all produced by the increased intra-ocular pressure are so familiar to us that they scarcely need more than enumeration on this occasion. Steamy, insensitive cornea occasioning rainbow phenomena around lights; faint ciliary congestion in acute stages and engorgement of ciliary veins that penetrate the anterior portion of the cornea; shallowing of the anterior chamber and oval enlargement of the pupil; more or less haziness of the media in consequence of which and also in consequence of the pressure on the retina there develops impairment of central and peripheral vision; if the condition has existed for any length of time, more or less cupping of the optic disc with possible pulsation of veins or arteries or both; in the acute stages, because of the haziness of the media, impossibility of seeing the details of the fundus; pain of varying degree, according to the intensity of the acute attack, sometimes in the eyeball, sometimes simulating a facial neuralgia, or occasionally dull and ill defined, or of a nature to reflexly excite nausea and vomiting; marked hardness, increased tension of the eyeball as determined by palpation or with instruments; all of these signs and symptoms form a clinical picture that the specialist readily recognizes as acute or congestive glaucoma.

There may have been prodromal signs before the attack, but the glaucomatous condition even then must have been present. I like the classification of stages used by Elliot of early glaucoma, established glaucoma, and late glaucoma, instead of prodromal, acute, chronic and absolute of most writers.

It is in the non-congestive forms of glaucoma that problems of diagnosis present that are often difficult to younger practitioners in ophthalmology, particularly in those cases of so-called simple glaucoma, in which the intra-ocular pressure is not at all times measurably increased. These are the cases that frequently puzzle us in diagnosis and raise questions as to treatment. Frequently they present little or no impairment of central vision; the onset of increased intra-ocular pressure has been insidious and its progress slow. The first intimation of anything wrong may be the discovery in the routine examination of a cupped disc, and then further examination elicits the glaucomatous condition. Or the patient may complain of dull pain, again of neuralgic pains in and around the eyes at times, blurring of the vision when reading as if his glasses do not fit. Such symptoms may indicate disturbances of accommodation from congestion of the ciliary body, or disturbance in the refractive power of the lens from increased pressure. It may occur in myopes as well as hyperopes.

Probably in these cases of so-called simple glaucoma the increase in tension is not constant, but intermittent. Before the days of more accurate testing of tension with the tonometer, there was question as to whether many of these simple glaucomas manifested any increased tension, it being too slight to be noted by digital examination, but careful tests with the tonometer reveal that, at times, increased tension exists.

It is in such cases that we must arrive at the diagnosis by a study of the visual fields, the central vision, the appearance of the optic disc and a record of the tension as taken with the tonometer at various times.

The fields for white and colors, particularly red and green, should be taken, not once, but frequently, to record the progress of the case. They should be taken by the same observer each time, and as far as possible under the same conditions as to light, environment, background, etc., for there is no examination that admits of a greater chance for error on the part of both patient and observer than a perimetric examination of the visual fields.

We are all familiar with the various irregularities and contractions of the fields that present in simple glaucoma, but certain features stand out prominently enough to make definite characteristics. The contraction of the field is usually, although not invariably, found on the nasal side. It may be more marked above or below, depending upon the pressure upon the optic nerve. It is my opinion that the position of the physiologic cup, whether central or temporal, may determine in the beginning the character of the shrinking of the visual field. It is well to record in our histories, in routine examination of cases, a brief description of the position, size and depth of the physiologic cup for future reference and comparison.

With the continuance of the intra-ocular pressure the contraction of the visual fields proceeds until final blindness is reached. The color fields

usually contract concentrically with the field for white, but atrophic processes in the optic nerve may alter this rule.

The blind part of the field, sooner or later, is found to be in contact with the blind spot of Mariotte as first pointed out by Bjerrum, and both relative and absolute paracentral scotomas of Seidel may be demonstrated merging with the blind spot of Mariotte.

To map out these defects one must use small objects of 1 mm. or 2 mm. on a Bjerrum screen or the excellent instrument devised by Dr. L. C. Peter, the campimeter, which I find convenient. Lloyds' stereocampimeter, made by Bausch and Lomb, is even more useful in cases that have binocular single vision. The discovery of Bjerrum's sign and the scotomas of Seidel doubtless furnish valuable testimony in the diagnosis of early glaucoma, but, as has been said, it is a method of examination that must be accurately done to avoid error.

TONOMETRY

We must always hold to the central feature of glaucoma, increased intra-ocular pressure. Without increased pressure there could be no glaucoma; with it, all the manifestations of glaucoma may present, depending upon the degree and the continuance of the pressure.

In simple glaucoma, the pressure may not be great, but it may be continuous. In some cases it may not be continuous, but may be intermittent.

The tonometer enables us to determine this with more accuracy than can be obtained with the fingers. Furthermore, a record of observations can be made so that comparisons can be made from time to time as to the condition of the pressure, which could not well be done with digital examinations.

In this lies one of its great values.

With any form of tonometer errors may arise from inaccuracy of technique, and with any of them, however carefully calibrated they may be on the basis of manometric measurements of normal intra-ocular pressure, there will be variations in results arising from such conditions as rigid or flaccid cornea, slight keratoconus, high astigmatism, regular or irregular, corneal scars, etc. Its value is a relative one. It may or may not give us an accurate reading of the intra-ocular pressure in terms of millimeters of mercury, but it will from day to day or week to week, if properly used, give us on the same patient the relation of impressibility of the eye to intra-ocular pressure.

My preference is for the Schiotz instrument because of its lightness and accurate construction. The patient should be lying flat on the back, so that the face may be in the horizontal position. One per cent holocain or butyn solution is used to cause anesthesia of the cornea. The patient is asked to fix some object on the ceiling so that the instrument can be placed exactly vertical on the cornea, the foot plate occupying the exact center of the cornea. Failure to do this will give inaccurate readings. I have noticed that two may work together to good advantage, one holding the instrument and keeping the patient's gaze in the right direction while the other makes the reading.

The instrument should be tested on the artificial metal cornea frequently, to be sure that the indicator arm registers accurately at zero on the scale. The instrument must be kept in perfect condition, so that the plunger glides easily.

Numerous observations seem to indicate that the normal limits of pressure seem to be between 15 mm. and 26 mm. on the Schiotz scale, but there may be individual cases where 28 mm. or even 30 mm. is normal.

PROBLEMS OF TREATMENT

Here we are confronted with difficulties that arise from our lack of definite, accurate knowledge of the etiology. Assuming the correctness of the statement of Fuchs that "genuine glaucoma develops only in an eye which has a predisposition to it," a dictum with which many will agree, the question naturally arises: What constitutes such a predisposition? If we knew exactly we should be on the way toward a rational prophylaxis. Lacking this definite knowledge we are forced to fall back on therapeutic measures that are largely empiric.

Most of these measures aim at combating some of the body conditions that are supposed to contribute to the development of glaucoma. In general they are reasonable for they include such measures as avoidance of excesses in diet and drink, avoidance of worry and hurry, prolonged hours of work and exhaustion, etc., etc., prescriptions that are not easily filled by many patients.

Few people realize the sagacity of the advice of the old medical philosopher that the best physicians to call in are Dr. Diet, Dr. Quiet and Dr. Merri-

man. As to our local therapeutic measures, they are all directed toward the main feature of the condition, the increased intraocular pressure, and are intended to facilitate and promote drainage from the eye.

We use myotics such as eserin and pilocarpin, and they have unquestionably shown their efficiency in a degree. The salicylate of eserin seems preferable to the sulphate, for it seems less irritating, and for continuous use in simple glaucoma, pilocarpin muriate or nitrate is to be preferred because of its less irritating effect on the iris.

The stretching of the iris resulting from the marked contraction of the sphincter muscle must draw the root of the iris away from the filtration angle and allow better circulation through that part. For the same reason the spaces of the iris are opened up and are supposed to be better able to absorb fluids from the anterior chamber.

One of the most important problems of treatment is that concerning operation, and particularly concerning operation on non-congestive or simple glaucoma. In congestive cases the evidence is clearer, for the accumulated experience of the masters in ophthalmology from Von Græfe down to those of present times speaks loudly in favor of operative means to counteract the increased intraocular pressure.

The debate waxes warm at times in regard to which method has the greatest value, and iridectomy still seems to have the best of it, but there seems to be little dissent from the view that some operative measure is necessary to bring about an artificial drainage.

It is different in the case of simple or non-congestive glaucoma. Here we have a condition that does not present the immediately dangerous features of the congestive type, and there are those whose experience and skill are great who maintain the inefficiency of operation and rely upon the powers of myotics and general measures to maintain the proper pressure equilibrium.

How are we to direct our way in the midst of such disagreement? It seems to me that the study of our cases by means of the tonometer and the visual fields must furnish the guide. It may not be amiss to refer to my own rule of practice in such cases.

If the case can be controlled and general measures and regular applications of pilocarpin will keep the tension within normal limits, if the contraction of the fields does not continue, the central vision remaining normal, operation is not urged, but the patient is informed of the importance of regular observation of the case and religiously regular treatment. My observation is that cases that can be controlled in this way are few. If, in spite of general treatment and regular use of myotics, the records of the tonometer show increased tension at times, even if not great, and the fields slowly contract, or show enlarging scotomas, even if central vision is normal, operation is advised and urged, the patient, so far as his intelligence will permit, being made acquainted with the condition and its dangers.

As to the method of operation to be employed to accomplish this artificial drainage, the time at my disposal will not permit a discussion.

As in the past many roads led to Rome, so here many methods of operation properly performed have brought about the desired result and will do so again if proper conditions obtain and they are properly performed. The operations that have been proposed and championed for this deplorable condition are so numerous as to indicate that the perfect one has not yet been devised.

HEADACHES FROM THE STANDPOINT OF THE OPHTHALMOLOGIST*

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St. Paul

No symptom in medicine is more prevalent than headache and few there are, indeed, who at some time or other have not been victims of it. When viewed from an ophthalmological standpoint headaches due to eye strain must of necessity be differentiated from other types of headaches with which they are most readily confused, and it is this point that will be particularly emphasized. However, headaches due to more general causes such as diseases of the brain, digestive tract, kidney, blood vessels, acute and chronic infections, intoxications (chemical), constitutional diseases, etc., should never be lost sight of.

In the experience of the oculist, eye strain is the most frequent cause of headache. The complaint is probably due to the effort of accommodating in the presence of a refractive error or maintaining single vision where a muscular imbalance exists, thereby producing a neuro-muscular tension. The exciting cause may be hypermetropia, hypermetropic astigmatism or more rarely myopic astigmatism, esophoria, exophoria or hyperphoria. As a rule headaches of ocular origin are associated with the use of the eyes for near work, having their onset in the afternoon or evening, and are relieved by sleep or a period of rest. Nevertheless there are cases in which this symptom appears upon rising in the morning and becomes steadily worse throughout the day, especially where a muscular imbalance exists. Headaches due to eye strain are usually supraorbital or frontal, less commonly occipital or vertical. It has been the experience of some observers that, in a general way, headache in the frontal region is due to hypermetropia, in the temporal region to hypermetropic astigmatism and in the occipital region to muscular imbalance. So nice a selection can be justly challenged. The character of the pain is most frequently of a dull or boring nature and almost always bilateral and of equal intensity. In extreme cases even nausea and vomiting may be complained of.

A small degree of hypermetropia or hypermetropic astigmatism is physiological for the human race and ordinarily gives rise to no symptoms. Even low degrees of muscular imbalance may be borne without discomfort. Nevertheless, the presence of a refractive error, however small, may, in certain individuals, be productive of the most annoying symptoms which, when optically corrected, are completely relieved. When a small refractive error or muscular imbalance produces eye strain there is always an additional etiological factor coupled with it, such as an unstable nervous system, lowered vitality from whatever cause or the excessive use of the eyes for near work. Such minor ocular derangements so frequently produce symptoms of eye strain in librarians, stenographers, bookkeepers, et cetera, that one might call it an occupational disease in this class of workers, due, no doubt, to prolonged reading, changing the gaze alternately from one near object to the other or faulty illumination.

There is a type of patient who, after a motor ride, shopping or moving picture entertainment, complains of pain in the eyes and base of the skull, the so-called "panorama headache." Usually, ophthalmological examination shows only a small degree of refractive error or muscular imbalance—more particularly the latter. In the opinion of the writer such cases are characterized by nervous instability.

Through medical inspection in public schools, much light has been thrown upon the causative factors in the production of apparent eye strain in children. The writer, during a service of seven years at the St. Paul Free Eye Dispensary, has retinoscoped 4,000 such cases, the usual complaint being difficulty with near work, e. g., frontal headache, epiphora, blurring of vision, burning, itching and smarting of the lids. No small number of these, upon a careful subjective examination, will be found to have normal vision for distance. When such is the case and the patients are refracted under a mydriatic (1 per cent atropin sulphate solution instilled into the eye three times a day for three days) many will show through retinoscopy but the smallest degree of refractive error. Neither will there be a muscular imbalance. It is plainly evident that the findings are out of all proportion to the ocular symptoms from which they complain. In most instances the cause lies in faulty hygiene, poor housing, poor or insufficient food or lack of sleep. If, in such cases, glasses are prescribed, they will be worn for a time through compulsion, novelty or imitation and will finally be cast aside. Some of these little patients are underweight and anemic,

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others scrofulous with hypertrophied tonsils and adenoids, enlarged cervical glands, follicular conjunctivitis, eczema, et cetera. The course of treatment to be pursued is self-evident.

Migraine headaches can usually be differentiated from those resulting from eye strain if sufficient history be taken. This malady affects women more frequently than men, in a proportion of about three to one. There is a marked hereditary tendency. In women it has its onset about the age of puberty and usually continues until after the menopause, pursuing its course in the form of paroxysmal attacks at regular intervals. Such is the general rule which finds many exceptions. The attacks may occur weekly, fortnightly or monthly and are very commonly present at the time of menstruation. Generally, the headache at first involves but one side of the head, usually the forehead or occiput, gradually extending over the whole calvarium. The pain is of a throbbing or binding nature and may be accompanied by sparkling light before the eyes which increases in extent until finally the patient is temporarily blind (scintillating scotoma). During these attacks the patient may complain that he sees only a portion of an object, the right or left, upper or lower half (hemianopia). Dizziness, nausea and vomiting are commonly present. Such a seizure lasts usually from six to twelve hours, sometimes longer, even for two or three days.

All gradations of the above clinical picture may occur. It is usually the atypical case who consults the oculist, with the hope that by a proper fitting of glasses headaches will cease. If, in such a case, the headache displays a hereditary tendency and periodicity over a considerable length of time and without particular reference to the use of the eyes for close work, the condition can be stamped as migraine. Minor errors of refraction should be corrected and in a few cases will prove helpful. That such a remedial measure will abolish an attack of migraine would be asking too much.

A condition allied to migraine headache is that associated with nervous asthenopia (copiopia hysterica). The condition differs from migraine in that the symptoms are a daily occurrence and are not subject to periodic attacks. Reading, even for a very short period of time, so fatigues accommodation that headache and blurred vision result and work must be set aside. Usually, it is only upon using the eyes for close work that the ocular symptoms become manifest. There are cases, however, in which the headache begins in the morning upon rising and is aggravated by reading. There may even be a sensitiveness of the eyes to light. Nervous asthenopia is frequently a symptom in women during the menopause. A diagnosis of nervous asthenopia can only be made in the absence of a refractive error or muscular imbalance proportionate to the degree of ocular symptoms present. Correction of minor errors of refraction will prove of no benefit in this condition.

Quite commonly hysterical and neurasthenic patients refer their headache to eye strain. As clinical entities, these conditions are so closely allied from an ophthalmological standpoint, that their symptomatology may be spoken of collectively. All gradations and combinations of the following ocular phenomena may be present; headache, muscular imbalance, poor visual memory, limitation of the visual field, imperfect accommodation, drooping of the lids, irregular or hyperactive pupils, temporary obscuration of vision, optical hallucinations, limitation of the color and light sense. While it is true that the exhaustion field is characteristic for neurasthenia, it sometimes occurs in hysteria. In this class of cases, the headache is more a sense of pressure, weight or fullness and, while it may be frontal or occipital in location, is frequently referred to the vertex. Tenderness of the scalp is not uncommonly associated with it. Optical correction of existing minor errors of refraction or measures for the relief of low degrees of muscular imbalance may prove helpful, but are rarely adequate.

An affection not infrequently mistaken for headache of ocular origin is the so-called vacuum headache, a condition established as a clinical entity by Sluder* and Ewing.* This malady is described by Sluder as "a low grade unending headache" brought about through the closure of the frontal sinus without nasal symptoms or signs (e. g. obstruction or secretion) and made worse by use of the eyes. The pain experienced is due to a partial absorption of the air contained within the sinus, with a resulting negative pressure rendering the walls sensitive. The headache though frontal is occasionally referred to the external angular process of the frontal bone. This type of headache is characteristically present in the morning, becoming worse with the use of the eyes for near work. However, there are cases where headaches are only precipitated by the use of the

*Trans. Am. Ophth. Soc., 1900.

eyes for near work. Unlike headaches due to eye strain, and which are generally a daily occurrence, vacuum headaches characteristically appear at irregular intervals and may disappear as suddenly as they appear. Just as in empyema of the frontal sinus, this type of headache is increased on stooping and often attended by a sense of dizziness. Ewing's sign, "tenderness of the upper, inner angle of the orbit at the point of attachment of the pulley of the superior oblique muscle and internal and external to it" is pathognomonic of the condition. As the function of this muscle is to turn the eye downward and inward, it is called into play during the act of accommodation, necessitating a tugging at the tender point. The tenderness of this area is explained by Sluder "as arising from a closure of the outlet of the frontal sinus thereby producing a negative pressure through absorption of the oxygen therein contained with a resulting congestion of the lining membrane together with the underlying bone." Tenderness of the eyeball to backward pressure, a clinical sign to which but little attention has been given, is almost always present. The nasal conditions that may give rise to vacuum headache Sluder groups into the following classes: (1) when there exists an enlargement or tilting of the septum tubercle out of the midline in a normal or particularly narrow nose; (2) narrowing or occlusion of the hiatus semilunaris through anatomical variation so that the uncinate process and bulla are in contact; (3) edema of the vault of the middle meatus; (4) anatomical insufficiency of the vault; (5) middle turbinate hypertrophy; (6) empyemas or coryzas that have gotten well but have left a degree of swelling in the vault of the middle meatus sufficient to keep the frontal sinus closed.

In view of the fact that this malady has a nasal origin, generally without a demonstrable gross anatomical or pathological change, it is difficult at times to convince oneself that this is the proper diagnosis in a given case even when there is present Ewing's sign, a tender eyeball and a history of periodic attacks. Fortunately, vacuum headaches lend themselves readily to a reliable therapeutic test. If a patient appears during an attack of headache it is the writer's custom for diagnostic purpose to place a pledget saturated with 1-1,000 adrenalin or an astringent beneath the middle turbinate for a few moments. If after a short time the headache disappears, or is diminished in its intensity, it is strong presumptive evidence that this symptom is due to insufficiency or lack of aeration of the frontal sinus. Treatment consists of applications of astringents to the region of the nasofrontal duct and when this appears inefficient or inappropriate, surgical procedure for the purpose of removing pathological or purely obstructive tissues.

From a differential diagnostic standpoint headaches due to eye strain will not be contrasted with those arising from empyemas or hyperplastic conditions of the paranasal sinuses. It is enough to say that so intimate is the anatomical relationship between the eyeball and the accessory sinuses that an examination of the former should be accompanied by a routine examination of the latter. If this is carried out, usually enough pathological evidence will be found within the nose to stamp a headache arising from this source.

Neuralgic phenomena, the expression of nasal (sphenopalatine) neurosis, offer a symptom complex too involving to be confounded with pain associated with eye strain.

The types of headaches ordinarily mistaken for those arising from eye strain have now been mentioned. To elaborate further would only prolong the paper to undue length. Speaking in general it is imperative for the proper estimation of optical error that the patient be refracted under a mydriatic, atropine in children, homatropine in the adult. It should ever be kept in mind that the retinoscopic finding, in the final analysis, is but a guide, the trial case the court of last appeal. A good refractionist is one possessing the following requisites: knowledge, accuracy, experience, judgment. Minor errors of refraction, those within physiological limits which apparently give rise to eye strain, should be fully corrected. But before this remedial measure is applied the case should be studied from a differential diagnostic standpoint. Is the headache really due to eye strain?

DISCUSSION

DR. JOHN FULTON, Saint Paul: I have had the privilege and pleasure of working with Dr. Berrisford for the past four years at the Saint Paul Free Dispensary, and I am familiar with the painstaking care and the absolute accuracy with which the refractive work is done. I read his paper a few days ago. He has added many important points to it since. Dr. Berrisford has given us a very excellent presentation of this very important branch of ophthalmology.

The percentage of eye cases coming before us suffering with headaches on account of eye difficulties is variously

estimated by different authors. Hogue, of Milwaukee, affirms that 50 per cent of headaches are due to eye strain. De Schweinitz, one of our most conservative and best known oculists, estimates that 70 per cent of all functional headaches are caused by eye strain.

The best definition of ocular headache that has been given is as follows: "An acute discomfort in and about the head that directly or indirectly results from organic or functional disorder of the visional apparatus."

The pain is usually frontal or occipital, but it may radiate to many other places: between the shoulders, in the precordia and deep in the mastoid.

The degree of refractive error has nothing to do with the amount of discomfort produced. In fact, the lower degrees seem to produce the most trouble. The same remark also applies to muscular insufficiencies.

So when the question is asked, what degree of ocular or muscular trouble should be corrected, my answer is: any degree that gives rise to severe symptoms that interferes with the patient's work and cannot be relieved by local and constitutional remedies.

The author of the paper has referred to migraine. I agree with Wilder in saying that this trouble is not of ocular origin, but seems to bear a relationship with the function of the pituitary body. Some of the best known English oculists claim that they have given great relief to the unfortunate persons who suffer from this malady by the internal administration of the whole of the pituitary gland as prepared by Armour.

The question naturally arises, how does eye strain produce headache? I heartily agree with Dunn and Ellis in thinking it is produced by increase of intracranial pressure. In a recent paper published by Dunn in the Archives of Ophthalmology, March, 1918, he enters into a prolonged explanation as to how this pressure is produced, but on account of the brief time allotted to us, it cannot be entered into here.

Jackson has called our attention to a class of patients suffering from pulmonary tuberculosis with lesion of considerable extent, but with great systemic resistance, who suffer with the most annoying asthenopia and ocular headaches, the correction of which gives the patient marked relief, but never complete until the lung trouble is completely healed. In many of these cases they are able to discard the glasses after complete convalescence from the tuberculous trouble.

The moving pictures are often accused of producing severe eye symptoms and headache. I am convinced that this never takes place to normal eyes. In fact, I am in the habit of telling my patients, after they have been refracted, to go and try the movies, and if they find their eyes are perfectly comfortable, I know their refractive trouble has been properly corrected.

A form of asthenopia, which is much neglected and too frequently looked upon as hysteria, is retinal asthenopia. In other words, this is an irritable retina. All bright lights are very annoying to the patient; they have distressing after-images and various kinds of color scotomata. Very great relief can be obtained for this trouble by the liberal use of adrenalin, both before and after refractive and muscular correction. Ocular headaches are due to fatigue. The most common exciting cause is long, continued use of accommodation and convergence in near work. The underlying ocular condition that brings this about is hyperopic astigmatism, associated with heterophoria.

The instinctive desire of everyone having refractive and muscular errors to maintain single binocular vision and normal clearness of sight is also a great factor in producing headache. People with one eye or those with one eye so defective that fusion of images is impossible, rarely have this form of trouble.

Dr. John Fulton, Saint Paul: I see we have Dr. Collins here from Duluth, one of the oldest and most experienced oculists. I think we would all like to hear from him.

Dr. Homer Collins, Duluth: I want to say that my experience has been in exact accord with Dr. Berrisford's, and I think he has covered the subject thoroughly. I really have nothing to add. The vacuum headaches we do come across occasionally, and often—as Dr. Berrisford says—they are more apt to be confusing because the nose shows so little abnormality. The only way I have ever found for testing was exactly the method he has used, shrinking the nasal mucous membrane, and then the relief was almost instantaneous.

Dr. Berrisford, St. Paul (closing): I wish to express to Dr. Fulton my sincere gratitude for the prominence he has given my paper by discussing it. His well known skill and wealth of experience gives to his remarks the utmost importance.

One portion of the paper I wish especially to emphasize: "vacuum headache" is a clear-cut and distinct clinical entity. It is difficult, at times, to convince oneself that this ailment is of nasal origin in view of the fact that upon rhinological examination the nose shows little if anything that might account for the symptoms manifested. However, the presence of a tender eyeball, tenderness at the upper inner angle of the orbit described by Ewing, and a history of periodic attacks are facts which very strongly suggest this diagnosis. If, during such an attack symptoms are rendered less severe or wholly disappear as the result of the therapeutic test already described, a diagnosis of "vacuum headache," the result of improper aeration of the frontal sinus, is justifiable.

BRONCHIAL ASTHMA*

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Asthma is a term which has been more or less loosely applied to conditions having dyspnea as a pronounced symptom. What has been learned during the past decade points to hypersensitiveness as the basic cause of asthma, so we shall restrict ourselves to bronchial asthma—a condition resulting from allergic reaction.

The vast amount of work done in the past ten years has done much to place the treatment of this disease on a satisfactory basis and permit it to be classed as a curable disease. Nothing new is being offered at this time because what is needed is a better comprehension of the facts already known, instead of piling up more. We are crushed and suffocated with dry, single facts. I agree with Van Rijnbert, the editor of Tijdschrift, who says, "What a blessing it would be if all the journals of the world would agree not to publish any new facts for ten years and devote their pages to collective reviews and monographs on the facts already known."

After being successful in treating a few cases of bronchial asthma, I felt very proud of my knowledge, but as the number of patients I saw increased, my pride decreased and now I am very humble.

A neurotic family history, epilepsy, hysteria, hayfever and eczema are frequently connected with bronchial asthma. Anaphylaxis is especially apt to occur.

Asthma commonly commences during the first decade, but may begin at any age. Unless relieved, it persists to old age.

The exciting causes of a paroxysm are of great variety. Conditions of climate and atmosphere; emanations from leaves, flowers or animals; various dusts; food proteins; bacterial products; chemical substances, nasal polypi and emotions and nervous disturbances are some of them. What may be a cause today may not be a cause at a later date. A complicating bronchitis may become a cause. Since there are such a large number of causes of asthma it is frequently, and at times impossible, to detect the cause.

The mode of onset of asthma, or the symptoms preceding the initial attack of asthma, has little bearing upon the cause, since, in the majority of cases, the onset is preceded with what the patient calls "a cold" or "bronchitis."

The time of year in which an attack of asthma begins and the season of the year, if it always limits the attack of asthma, are important. Attacks during the summer months are usually caused by the protein in the pollen of plants. In many instances this summer type of pollen asthma is prolonged throughout the year by bacteria. In those who have had asthma for a considerable length of time there may be bronchitis and emphysema, so that the removal of the offending cause must be followed by treatment of the bronchitis, if we are to get relief.

When a person is sensitive to a specific substance certain symptoms are produced by that substance when taken into the body. Proteins are widely distributed in nature and it is the protein in the substance which causes asthma. Proteins enter the body by ingestion, as in foods; by inhalation, as in pollens, dust and dander; by absorption through the skin and mucous membranes; by infection, from pathologic bacteria in teeth, tonsils, nose, throat and lungs; and by injection with horse serum. In the case of bacteria we have to deal with the protein element as it is the protein element only which makes a positive skin test. A negative test does not rule out a particular bacterium as a cause, since the infectious element of the bacteria may cause the asthma.

The attacks are frequently during the night, after a few hours of sleep. The onset is fairly sudden with premonitory symptoms of oppression in the chest and may be accompanied by sneezing, flatulence, polyuria and great depression. During the paroxysm the respirations are slow with short inspirations and long, wheezy expirations. There are strong contractions of the accessory respiratory muscles. The patient is pale or cyanotic and anxious. There is cold perspiration on the skin. There may be paroxysms of coughing until a viscid sputum is raised. Then relief follows. An attack may last from a few minutes to a few hours. The patient sits, leaning forward, and may grip something to reinforce the chest muscles. The thorax is fixed in the expanded position. On percussion there is hyperresonance and on auscultation numerous musical râles and noises may be heard.

The sputum contains small gelatinous masses, being spirally twisted casts of the small bronchi. Often numerous eosinophiles are embedded in

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them. These masses, or "Curschmann's Spirals," are quite diagnostic of true asthma, but are usually absent in old cases with emphysema. An eosinophilia of from 5 to 30 per cent may be present in the blood. Only in bronchial asthma do a blood and sputa eosinophilia occur simultaneously. Eosinophilia is regarded as one of the chief clinical and pathologic symptoms of allergy.

When there have been several severe and prolonged attacks, more or less emphysema develops. One would expect some cardiac hypertrophy in cases of long standing, but hypertrophy is not always present.

Huber and Koessler,[1] in their microscopic study of the lungs of sixteen cases of the bacterial type of bronchial asthma, found hypertrophy of the bronchial musculature (4 cases); cellular infiltration (3); eosinophiles (3); thickened bronchial arteries (2); extensive cellular infiltration of the bronchial mucous glands (2); atrophy of the bronchial glands (1); calcified and ossified bronchial cartilages (2); occlusion of bronchioles (2).

In making a study of a patient having symptoms of asthma we follow a definite routine as far as it is practicable or possible. The routine is followed both in private practice and at the Minneapolis General Hospital. This is of necessity if we are not to overlook some important finding. Besides, it is good practice.

1. A complete history is taken and recorded, giving special attention to age at onset of symptoms; seasons when symptoms begin or are worse; place where attack began; what makes it worse; what gives relief; whether occupation is a factor and all circumstances associated with the first attack.
2. Complete physical examination, including a diligent search for foci of infection.
3. Examination of sputum and nasal secretions.
4. Complete blood examination.
5. Wassermann of the blood.
6. Urinalysis (24-hour specimen).
7. Basal metabolism estimation.
8. Skin tests to the proteins in food, pollen, animal hair and dander, bacteria, et cetera.
9. Roentgen ray of lungs, heart, paranasal sinuses and teeth.
10. Nose and throat examination.
11. Complete dental examination.
12. Tuberculin test.
13. Other special examinations when indicated.

SENSITIZATION

The subject of sensitization is relatively new and comparatively few realize its importance and the amount of study that it has received in the past few years. Various terms are used to express sensitization. The commoner ones are "hypersensitiveness," "allergy," and "anaphylaxis." Anaphylaxis was discovered in 1902 by Richet. He called it "anaphylaxis" because he incorrectly thought it was opposed to "prophylaxis." Eight years later Meltzer noted the similarity of the bronchial obstruction of asthma and that found in animals dying in anaphylactic shock.

Active Sensitization.—As far as we know, sensitization is caused by the protein element in a substance. Proteins are widely distributed in nature and are present sometimes where we least expect to find them. As they concern us, they are present in food, animal dander and hair, house dust, bacteria, pollens, face powders, sachets and drugs.

We are beginning to recognize that there are different kinds of sensitization. Piness[2] observes that anaphylaxis is an induced and experimental hypersensitiveness in animals; it is rare in human beings; while allergy is a natural, inherited hypersensitiveness affecting only human beings. The hypersensitive state may be present at birth, inherited or conveyed by mother to child.

The body cells produce specific antibodies following the injection of protein. After a certain time antibodies are produced in such quantities that, upon re-introduction of the same protein, certain symptoms follow. These symptoms are generally called "anaphylactic shock."

If you inject a guinea pig with 1 c.c. of horse serum, no symptoms are observed. If you inject .01 c.c. of serum daily for twelve days and then inject 1 c.c., no symptoms are produced. If you wait twelve months and then inject 1 c.c. of serum, you will get anaphylactic death. (The pig was previously immunized and has returned to the sensitive state.) If you inject a guinea pig with .01 c.c. of serum and in fifteen days inject 1 c.c. of the same serum you will get anaphylactic death. If you inject .01 c.c. of serum and in twelve days inject a sublethal dose you may get symptoms, but not death; then you may give several c.c. of serum without symptoms. The sublethal dose has, for the time being, desensitized the animal. It has united with the antibodies and taken them away from the cells. The antibodies are not now attached

to the cells. After a time the antibodies will become attached to the cells and then the union of antigen (protein) to them will produce symptoms. A guinea pig may be sensitized by an amount as small as 0.000001 c.c. of serum.

When antibodies are few and attached to the cells we have the sensitized state. When they are in excess we have the immune state.

In the guinea pig death results from the contraction of the smooth muscles in the bronchi.

Passive Sensitization.—If you take serum from an animal that has been actively sensitized and inject it into a normal animal and wait for two days you will find that the second animal is sensitized to the same protein as was used to desensitize the first animal. This transfer of immune bodies from one animal to another, by means of serum, is an example of passive sensitization.

It is possible to sensitize human beings in this artificial way to a foreign protein, but, unlike the guinea pig, they do not of necessity remain permanently sensitized. In a number of clinical conditions sensitization has occurred, not through any known artificial way, but in an unknown natural way. In this group are hay-fever, bronchial asthma, angioneurotic edema, and acute gastro-enteritis. These are examples of allergy.

When a definite type of cells are sensitized we get a group of symptoms depending upon the character of the cells. If the smooth muscle fibers in the bronchi are sensitized, together with the mucous membrane cells in the bronchial tree, we have the symptoms of bronchial asthma. When the mucous membrane of the eye, nose and throat is sensitized, we have the symptoms of hay-fever; when the cells of the gastro-intestinal tract are sensitized, we have gastro-enteritis; when of the skin, we have urticaria, and when of the connective tissue, we have angioneurotic edema.

Coca gives the following differences between anaphylaxis and allergy:

1. The exciting agent of anaphylaxis is always antigenic in character. The exciting agent of allergy may or may not be an antigenic substance. (For example: it may be a drug such as arsphenamin or acetylsalicylic acid.)
2. Although anaphylaxis may be transmitted from mother to offspring, it is not inheritable in the true sense of the word. It is always, primarily, an artificial condition induced by the introduction of antigenic substance into the body of some susceptible animal.
   Allergy, on the other hand, is always based, primarily, on a natural inherited makeup. The sensitiveness classed as allergy does not in every instance appear to depend on previous contact with an exciting substance. An individual, for example, may have a violent allergic reaction when he comes in contact with the exciting substance apparently for the first time.
3. The phenomenon of desensitization, which can quickly and invariably be brought about in animals with anaphylactic sensitiveness, is entirely wanting in allergy. The state of reduced sensitiveness observed clinically, after treatment of allergy by hypodermic injections of the exciting agent, is never complete nor is it comparable with the above.

Human beings who have become sensitive to some protein are far more sensitive than animals that have been sensitized by injecting foreign protein. For example: It takes relatively more foreign protein with animals, which have been sensitized, to produce marked symptoms than is required in a sensitive human being.

The time of the occurrence of symptoms varies in human beings. It varies from a few seconds to several hours. A patient may be sensitive to a protein at one time and only mildly sensitive a week later, or he may not be sensitive at all. It has been shown that, when an animal is sensitized to three antigens, desensitization to all three might be effected by using only one of the antigens.

The important clinical manifestations of sensitization are: (1) allergy and anaphylaxis; (2) the immune reaction to smallpox vaccine; (3) the tuberculin reaction; and (4) serum sickness.

In serum sickness the symptoms appear from the first to the fifteenth day after injection. The symptoms are late after an initial injection, but after a second injection they usually occur in from three to six days with more marked local and general reaction, and edema and urticaria may be present in twenty-four hours. A reaction consists of a rash which is very itchy and may be accompanied by painful swollen joints, adenitis, albuminuria and fever.

THE SKIN TEST

One of the most practical ways of discerning whether a patient is sensitive or not is by means

of the skin test. Von Pirquet's test with tuberculin "O.T." is the basis for all tests of this kind. A positive reaction consists of a distinct urticarial wheal surrounded by a zone of erythema in the presence of a negative control test. A true reaction is always indicated by a wheal having an irregular outline.

The skin test should not be relied upon entirely, and its results should be used only as a clue. I will mention some of the reasons for this statement. There are occasional transitory periods during which a patient may not react cutaneously to a protein to which he is sensitive. This makes it necessary to make repeated tests in suspected cases. About 50 per cent of the people who are sensitized at all show multiple sensitization and a patient, at the time of the test, may be temporarily desensitized to one or more of the proteins being uesd and will be cutaneously negative to that protein, although he reacts positively to some other protein. One should not allow a negative skin reaction to rule out a protein which is strongly suspected. One may also get a positive reaction, due to the fact that the cutaneous cells are sensitized, even though they are not involved directly in the clinical type of the disease.

Besides testing with proteins from the usual foods, pollens and animal emanations, one frequently must suspect unusual sources of protein such as street dust, house dust (including that from wall paper), wall hangings, glue, boxwood, face and tooth powders, woolen and grass rugs, pillows, mattresses, felt hats and many others. When the skin tests fail to give any definite information it may be necessary to try some of the suspected substances on the patient, always remembering that ingested food or inhaled dust may not produce symptoms until six or eight hours have elapsed.

ASTHMA IN CHILDREN

Ratner[3] calls our attention to the fact that many physicians still labor under the impression that very young infants do not suffer from asthma. He states that recurrent attacks of hypernea or dyspnea, without a rise in temperature and with the lungs containing sibilant and sonorous râles which gradually clear up in twenty-four to seventy-two hours, should be looked upon as asthma, no matter how young the infant; and that the cessation of râles, after the injection of adrenalin or atropin, will prove the diagnosis.

Abt[4] states that, clinically, we may recognize two main varieties: (1) cases associated with bronchitis, and (2) cases characterized by sudden onset with a tendency to periodic recurrences. The first form begins with marked bronchitis, fever, lassitude, rhinitis, restlessness and even delirium. Anorexia and vomiting may occur. Respirations may be fifty or eighty per minute. The breathing is loud and noisy. There is an immobile appearance of the chest during expiration. Numerous dry, whistling, sibilant râles are heard. The cough is disturbing. The second type of asthma, as it occurs in children, resembles in many respects the asthma of adults. As a rule, children who have apparently been in normal health are suddenly attacked with severe dyspnea shortly after retiring. The chief trouble is expiratory. The lungs are hyperresonant. Loud, whistling and sibilant râles are heard. The attack usually disappears suddenly.

We must be careful to differeniate asthma from diphtheria, acute laryngitis, whooping cough, retropharyngeal abscess, enlarged bronchial glands, enlarged thymus, congenital stridor, foreign bodies in larynx or trachea and ulcer of the larynx.

The common sources of foreign protein in infants' food are milk and egg. Shannon and O'Keefe have shown that infants may be sensitized to foreign protein by the passage of these proteins through the mother's milk; while Hermann has reported that pollens may pass through cows' milk and that individuals, who are sensitive to pollen, will have symptoms on taking this milk. It is frequently observed that a case sensitive to egg will get no reaction if the egg has been well cooked, and that a case sensitive to milk will frequently be able to take boiled milk without symptoms.

TREATMENT

The treatment of asthma is the treatment of the cause. A careful history is the most important part of the study to bring out the cause. Each patient with asthma presents a definite problem for solution. Practically no two cases are alike, and this fact makes it difficult to give any classification of treatment and, perhaps, explains why one form of treatment gives results in one case and not in another having, apparently, the same cause.

First, all foci of infection should be properly treated, as some patients have an attack of asthma as a result of a focus of infection rather than an arthritis or an attack of neuralgia. A few cases have been reported where the patients had an at-

tack of fever of obscure origin followed by an improvement in their asthmatic condition. This suggests that the successful treatment of asthma may, in certain cases, be sought in the factors causing or associated with fever.

I saw a patient three years ago suffering from very severe asthma. Before any relief was obtained she went to Florida and then to California and, after getting the advice of several physicians and trying various remedies, finally came home in disgust. A short time after her return home her asthma suddenly left her and she has had complete freedom for over two years. This appears to be a spontaneous cure.

If the food group of proteins is the cause, the foods containing them should be completely avoided for at least four or five months. If this is impracticable, the patient should be desensitized against the offending protein. Desensitization, unfortunately, lasts only a few months.

If asthma is due to the pollen group, the patient should receive subcutaneous injections of pollen antigen beginning fourteen weeks prior to the expected date of attack.

If asthma is due to epidermal dust or to hair, the patient may be desensitized, but it is better to keep him away from the source of the offending substance.

If asthma is due to orris root or drugs, these should be avoided. If due to house dust, desensitization or a change of climate would be indicated. As a general rule some benefit may be obtained by some supervision of the patient's mode of living. The diet should be low in animal protein, patient should have a short period in bed to improve the digestion, and a change of climate may be of value. Discipline is essential, as many asthmatics have strong neurotic tendencies.

Good results have been reported in a few instances by the use of non-specific proteins such as typhoid vaccine, defibrinated blood from the patient and also injections of peptone. Many asthmatics show a great sensitivity to tuberculin. Tuberculin, in many instances, exerts a beneficial effect upon them. Tuberculin therapy should be cautiously tried where a specific agent, coming from without, cannot be determined. Tuberculin therapy may be of use as an auxiliary to specific protein therapy. Give 1 c.c. of a 1 to 100000 dilution of Koch's O.T. on alternate days. Increase dose after a few days, but avoid reactions. Too large a dose may cause a severe attack of asthma.

A certain number of patients have a chronic bronchitis accompanying the asthma. In these cases treatment of the bronchitis should be added to whatever other treatment they are receiving. A vaccine made from the predominating organisms in the sputum offers very good results in about 50 per cent of these so-called bacterial asthmatics. To get the best results in this type, the vaccine must be made by a competent serologist and administered by one who understands vaccine therapy. The permanency of relief depends upon the amount of treatment and the patient's power of resistance. Vaccines are successful only in case some local reaction at the place of injection follows the subcutaneous dose. The usual initial dose is 100 million, rapidly increased every fifth or sixth day until local reaction occurs, or until five or six injections have been given without local reaction. Vaccines produce only active immunity. They should be used with great care in the presence of acute infection. Their greatest use is in the recurrent type of asthma where, by producing a degree of active immunity, the hope of modifying the next attack is reasonable.

The following cases are reported because of the apparent specific action of the vaccine used.

CASE REPORTS

No. 8213 (M). Widow, aged 60. Always quite well until September, 1920, when she developed bronchitis and asthma. In bed thirteen weeks. In January, 1921, her physician did an extensive nasal operation, thinking it would help the asthma. Asthma and cough disappeared two days after the operation, but returned in five weeks. On Feb. 1, 1921, she had a second nasal operation without any good effects, and asthma continnued. She consulted me in August, 1921, asking for enough relief so that she might get along without a nurse. She had difficult breathing in attacks lasting from one to several hours at a time, worse at night. There was a productive cough; circulatory, digestive and urinary systems appeared normal. Tonsils and all doubtful teeth were removed six months previously. Lungs were slightly emphysematous, with prolonged expiratory murmurs, accompanied by numerous and various types of musical râles. She was negative to various skin tests. A vaccine obtained from her sputum was given her and at the end of three weeks she was completely relieved. One month later she sat for a half hour with her feet in cold plaster of paris and two days later she was having severe bronchitis and asthma, with a temperature of 102. A vaccine was prepared and given her and she again had complete relief. Again, on Jan. 1, 1922, she rode in a cold street car and soon had severe bronchial asthma, which was cleared up after six injections of autogenous vaccine. She is at present having no difficulty.

No. 8076 (G). Previous history negative. On Sept. 26, 1920, patient developed a severe attack of urticaria, two days after eating barracuda (deep-sea fish). Since then red meats, ice cream or chocolate aggravate the urticaria. On examination, all organs appeared normal. Skin had some large areas of urticaria. Complete blood examinations, including Wassermann, were normal. Roentgen ray of the gastro-intestinal tract showed ileo-stasis, otherwise negative. The urine was negative. One year later she developed bronchitis with difficult breathing, followed in two days by urticaria and numerous musical râles in both lungs. The usual skin tests were negative, except for the streptococcus hemolyticus, non-hemolyticus and viridans, which were slightly positive. An autogenous vaccine was made from the sputum. One c.c. of a vaccine containing streptococcus 50 M to c.c. and gram positive diplococcus 100 M to c.c. was given, and two days later she had a severe attack of urticaria. Then she was given 0.00005 of a c.c. and, two days later, had slight urticaria, and on trying different dilutions it was found that 0.0000001 c.c. did not produce urticaria. This was increased to 0.00005 c.c. without urticaria. Then she developed sudden rise of temperature to 104 and general aching, with some soreness in the breast, followed, in twenty-four hours, by the worst attack of urticaria she had ever had. These symptoms subsided in about three days and returned in two weeks, with similar results. There did not seem to be fluctuation in the breast but, because of the history, it was opened about ten days later and two ounces of pus obtained. A culture from this pus gave a pure growth of large gram plus diplococcus, the same as was found in the sputum. The patient has had no asthma or urticaria for the past two years.

CONCLUSIONS

A careful history often gives the clue to a correct diagnosis. Such a history, a complete physical examination, and properly interpreted skin tests, are the three essentials in the diagnosis.

Bronchial asthma may have widely different etiologic factors. It is frequently a complication of, or augmented by, pathologic agents.

The symptoms in infants may be unlike those in adults.

Asthma may now be regarded as a curable disease.

The treatment may vary greatly in different individuals. It depends entirely upon the cause of the asthma.

BIBLIOGRAPHY

1. Huber and Koessler: Arch. Int. Med., 30:689, Dec. 15, 1922.
2. Piness: Northwest. Med., 22:1, January, 1923.
3. Ratner, B.: Certain aspects of eczema and asthma in infancy and childhood from the standpoint of allergy. Am. Jour. Dis. Child., 24:346, October, 1922.
4. Abt, I. A.: Asthma in children. Med. Clin. No. Am., 1:5, March, 1918.
5. Duke, W. W.: Specific hypersensitiveness as a common cause of illness. Annals Clinical Med., 1:3, November, 1922.
6. Cooke, R. A.: Protein sensitization in the human, with special reference to bronchial asthma and hay-fever. Med. Clinics No. Am., 1:3, November, 1917.
7. Sanford, A. H.: Hypersensitivity to food proteins. Med. Clinics No. Am., 5:2, September, 1921.
8. Anderson, J. F.: Some clinical manifestations of the anaphylactic reactions. N. Y. Med. Jour., 97:6.
9. Walker, I. C.: Clinical study of 400 patients with bronchial asthma. Boston Med. & Surg. Jour., 179:288, 1918.
10. Rackemann, F. M.: The vaccine treatment of asthma. Med. Clinics No. Am., 4:6, May, 1921.

DISCUSSION

Dr. C. N. Hensel, St. Paul: The fundamental principles underlying the diagnosis and the treatment of bronchial asthma on the basis of protein sensitization, are pretty well established. These principles have been adequately presented by Dr. Lajoie and so, in discussing his paper, we need only emphasize certain points. First protein sensitization is not a cure-all, but is a means by which we can make differential diagnoses in cases of bronchial asthma, between the conditions in which the patient is sensitive to foreign proteins causing his asthma, and conditions in which he is not sensitive.

We must recognize that the skin tests are absolutely specific, and if we are guided by the skin tests we have an index to treatment. We must remember that in cases of asthma coming on in the early years of life, even up to thirty-five years of age, in a large proportion of the cases (upwards of ninety per cent), foreign proteins are the cause. You get a positive skin test, and following along the lines of that positive skin test you get relief in treatment. From thirty-five to forty-five years you have a larger proportion of cases that are not sensitive. In cases beginning with bronchial asthma after forty-five very few show positive skin tests, and therefore the specific line of treatment is not indicated.

If we bear these two facts in mind, namely, that the cases with onset in early life are the protein positive cases and the cases with onset in later life are the protein negative cases, then we have two general guides for treatment. In the young the foods play a prominent part, animal emanations another prominent part, plant pollens causing less disturbance. In older people the conditions are much more likely to be cardio-renal disease, associated with hypertension and chronic sinus disease. I personally have had very little success in the removal of tonsils in these cases of asthma in middle life, but I have found a great deal of success in having these cases examined by a careful nose and throat specialist with reference to the middle and superior turbinates and with reference to ethmoid infection and nasal polypus.

The case that Dr. Lajoie described apparently has a sinus infection of low grade. Perhaps pus is not directly demonstrable, but there is a stringy, glairy, viscid mucus. Those cases light up asthma due to any chilling as the doctor has described. These are the cases where adequate nasal treatment relieving nasal pressure give a great deal of relief.

And finally, in the adult non-sensitive type of cases, as Dr. Lajoie has said, autogenous vaccines are found helpful. Sometimes your laboratory will report two organisms which show equal growth. Vaccines should be made of both strains, testing the patient with both, and using the strain finally which gives you the local reaction at the site of the inoculation.

In conclusion, do not denounce the skin test because you do not always get a positive reaction.

You cannot expect positive reactions in more than 60 per cent of all your cases, certainly a sufficient percentage to make it worth while.

DR. C. B. WRIGHT, Minneapolis: I feel, with Dr. Lajoie, very humble in discussing this subject because my personal experiences have not been so brilliant as the literature which I have read. There are a number of things, I think, in the discussion of this subject which are of great interest. First, one will, of course, be successful in the treatment of these cases in direct proportion to the amount of thoroughness and care with which he studies each individual case. Since the use of the desensitization test I think there has been somewhat of a tendency on the part of men working on this subject not to study as carefully as they should the clinical findings on the patient himself and to assume that because he is sensitive to certain proteins he must have true bronchial asthma and on that basis one is, of course, apt to fail.

In order to prove, it seems to me, that the offending protein is the cause of this disease, one should not only be able to get sensitization of the skin but he should also be able to cure the patient by the removal of this protein. Without that therapeutic test I think our conclusions are entirely groundless. The greatest difficulty we have in the differential diagnosis of asthma is with the older patients. In cases that start in patients over fifty years of age it is usually not true bronchial asthma but it is chronic bronchitis.

This is the field in which the proprietary medicine has officiated for years, and I believe we have a remedy made in St. Paul on the basis of our good friends, stramonium leaves and saltpeter, and it is a very valuable thing in relieving acute attacks. In addition to that, the other antispasmodics are used in this type of case. The very old patients present a difficult proposition. Once in a while a vaccine will do them some good, but my experience is not so entirely satisfactory as the literature would lead me to believe.

The whole subject is a large one. Then there are so many ramifications, so many different types of cases that later get attacks of dypnea or asthmatic attacks that the whole situation depends, first, in my opinion, on the thoroughness with which these cases are worked up and, secondly, on the co-operation of your patient; that, in my opinion, is the most difficult thing of all. In the young, where our results should appear most favorable, if we get these cases they are the most difficult people to co-operate with. They come in for immediate relief and you only see them again when they come back for relief again. The older patient will always co-operate but unfortunately that is the type of case in which we get very much less brilliant results.

DR. JOHN M. LAJOIE (closing): I have nothing further to add except to bring to your attention a few points. We always try to get the co-operation of the patient and make a thorough physical examination in an attempt to locate any foci of infection and, if the patient is under forty-five or fifty, make thorough skin tests with various proteins. It sometimes happens that an asthmatic consults a physician and, because he has asthma, nothing much is done for him. A prescription will probably be given him with the hope that it may help him. I have seen a few patients who have had this kind of treatment. I believe that with good, hard work, coupled with a vivid imagination, we will be more successful in the future than we have ever been in the past in discovering the cause of bronchial asthma in a given case.

DON'T WORRY IF YOU CAN'T SLEEP NIGHTS

To make a business of sleep is a bad habit. That is what persons do who worry because they can't sleep.

In answering a question about insomnia, HYGEIA, the popular health magazine, in its April issue declares that the chief harmful effects from not sleeping are caused not by sleeplessness, but by worry over not sleeping.

Sleep should and will come naturally, if one will only realize that it is rest and not sleep that is needed, says the health journal.

Of course it is important to pay attention to the ordinary rules of hygiene, with regard to exercise, fresh air and reasonable diet. But, above all, it is important to fill one's life with satisfactory work and play.

The best incentive to sleep is still the feeling of "something attempted, something done," particularly something to help others.

As to the amount of sleep needed by different persons, that varies within wide limits and is much modified by habit. Many energetic, active individuals get along quite well with four or five hours of sleep. The proper amount for the average adult, however, is usually between seven and eight hours.

DIAGNOSIS OF ANOMALOUS RENAL ARTERY AS A CAUSE OF UPPER URINARY TRACT STASIS*

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Anomalies of the renal circulation are of common occurrence. They are found as abnormal divisions or distributions of an otherwise normal artery given off from the aorta or, as is more important in the present connection, as supernumerary trunks from the aorta. Such an abnormally placed division of the renal artery or anomalous supernumerary trunk may lie in sufficiently intimate contact with the upper ureter or uretero-pelvic junction to interfere with the peristaltic expulsion of urine from the renal pelvis.

The earliest mention of anomalous renal artery as a cause of hydronephrosis is to be found in Rayer's "Traité des Maladies des Reins," 1842.[1] Of the fifty-two cases of hydronephrosis collected by Roberts in "Urinary and Renal Diseases," 1885,[2] two were due to this cause. Since the time of these early publications anomalous artery has come to be generally recognized as a definite cause of hydronephrosis. In the present literature the subject is given frequent consideration. Some of these later publications question anomalous artery as a primary cause of hydronephrosis. Geraghty and Frontz[3] for example believe that almost invariably there is another cause present and that the enlarging pelvis folds over the artery simply as an incident in the pathologic process. Certainly it is a situation in which cause and effect are easily confused and that such is the sequence of events in some cases there can be no doubt.

Possibly the process is initiated in most cases by some degree of stasis from another cause, of itself unimportant or even temporary. As causes of such stasis may be mentioned functional disorders in the peristaltic activity of the ureter, insignificant narrowings, pregnancy and inflammatory processes. The frequency of anomalous renal artery without hydronephrosis proves conclusively that in most instances the contact with the ureter is without incident. A slight distention of the ureter and pelvis from any cause, however, even though it be temporary, may so increase the pressure of contact that grooving and folding of the ureter begin. Such deformity becomes an independent cause of obstruction. Contact with the artery and increased uretero-pelvic pressure above this point are now mutually maintained. What was formerly an innocent vascular anomaly becomes an important factor in pathology.

Whatever may be the exact explanation of the pathologic physiology of the process it is a fact that the present literature records numerous cases in which this was the only cause of obstruction which could be determined. Quinby[4] has recently reported six such cases. From the standpoint of the importance and frequency of anomalous artery as a cause of hydronephrosis the publication of Mayo, Braasch and MacCarty[5] is most significant. In twenty-seven cases of hydronephrosis anomalous arteries were noted in twenty. In thirteen of these simple division of the artery cured the condition. That is to say anomalous arteries were present in 74 per cent and were apparently the cause of the disease in 48 per cent of the cases.

Most of the cases of this sort reported describe well established hydronephroses (pelvic capacities of 150 c.c. or more). From this general fact the inference is that no criteria for early diagnosis are available. As a result surgical treatment is delayed until extensive dilatation has ensued, marked impairment of function is manifest or the prolonged painful symptoms force resort to surgical exploration. This is undertaken in the hope, but not without misgiving, that a situation may be found correctible by a surgical procedure short of nephrectomy.

It is obviously to be desired that the presence of such offending renal arteries be recognized before they have wrought these extensive anatomical changes with entailed impairment of function and long period of suffering. It should be of value to point out clinical means of recognizing these cases while they are still in a condition well described as "stasis" and before they have advanced to the more extensive damage described as "hydronephrosis." The purpose of the present paper is to point out certain criteria to be found in the pyelogram which, taken in association with the other clinical features, permit a diagnosis of upper urinary tract stasis due to anomalous renal artery to be made with reasonable assurance and at an early stage of the process.

*Presented before the annual meeting of Minnesota State Medical Association, St. Paul, October, 1923.

In the present literature concerning anomalous artery obstruction there is not available any detailed and comprehensive consideration of all the features of the pyelogram which may be of value

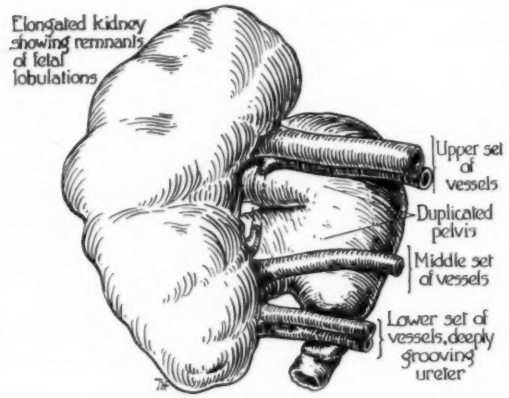

Figure 1. First case cited. Kidney removed at operation. Three sets of renal vessels. Those entering the lower angle of the hilum lie in intimate contact with the uretero-pelvic junction which they compress and deeply groove. There is well marked dilatation of the pelvis, which divides into upper and lower halves before entering the hilum.

in diagnosticating the condition. Various writers, however, allude to certain individual features which may be of such value. For example Braasch[6] speaks of and illustrates a "pyriform dilatation" of the pelvis as peculiar to anomalous artery obstruction. Sanes[7] briefly mentions "pear shaped dilatation" as characteristic of the condition, but goes no further[8] in describing this feature of the pyelogram. Crabtree[9] gives particular importance to absence of filling of the uretero-pelvic junction area or demonstratable constriction in this region. He reports nine cases with reproductions of the pyelograms in which he considers such deformity to be present. Mention is frequently made of kinking and folding of the ureter as seen in the pyelograms of these kidneys.

Filling defects, demonstrable compression, kinking and folding of this sort, when present, are of great diagnostic importance, but in the early stages of the process may be well-nigh incapable of demonstration in the pyelogram. Pelvic or ureteral dilatation due to such incomplete obstructions probably occurs only after a considerable time and even when present is practically impossible to recognize as definitely characteristic.

During the past year a number of these cases have been encountered and carefully studied. From this experience it is felt that the pyelogram almost regularly exhibits a congenital type of deformity of distinct diagnostic value not hitherto emphasized in this connection. The observations leading to the importance which is attached to this feature of the pyelogram may be best presented by reference to the clinical histories of the cases affording the observations. In this reference to cases clinical detail, completeness and sequence will be subordinated to development of the subject.

On careful dissection and examination of a hydronephrotic kidney (Fig. 1) removed at operation, three sets of vessels, an artery and vein in each case, were found entering the hilum anterior to the pelvis, a set at the upper angle, a set at the middle and a set at the lower angle. The last vessels lay in intimate contact with the uretero-pelvic junction, which they compressed and deeply grooved. The uretero-pelvic junction was hooked-up on these vessels and partially kinked over them. The dilated pelvis showed a dichotomous branching into upper and lower halves just at its entrance into the hilum. On section (Fig. 2), it was found that each intra-renal half gave off superior, middle and inferior calices, all of which were greatly dilated.

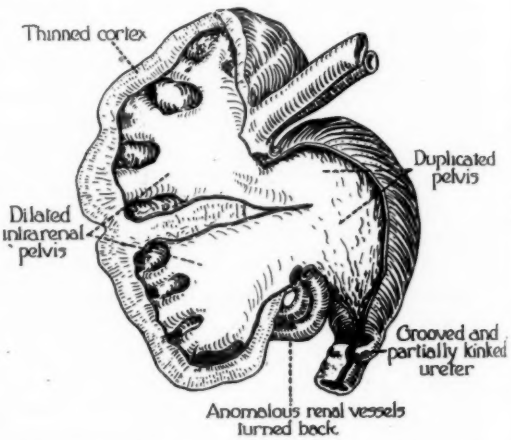

Figure 2. First case cited. Cross section of same kidney shown in Figure 1. The lower set of vessels have been lifted away from the uretero-pelvic junction to show the grooving and effectual obstruction which they produce at this point. Slight enlargement and thickening of ureter below probably due to inflammatory change. Note the complete duplication of the intra-renal portion of the pelvis and extensive dilatation and thinning of kidney substance.

The earliest embryologic faults which we know could determine this anomaly of the pelvis were either the development of two ureteral buds from

the wolffian duct with later fusion of the stalks into a common pelvis and ureter or a prematurely early dichotomous branching of a single ureteral bud, each branch going on to the formation of three nor-

Figure 3. First case cited. Pyelo-ureterogram of kidney shown in Figures 1 and 2. Dilatation so advanced that detailed pelvic configuration can not be made out. No significant dilatation of ureter, but a fold, obstruction or filling defect at its junction with the pelvis is evident.

mally disposed major calices. In either case the development of the permanent vascular channels of this kidney followed the same early division as exhibited by the earlier fetal development of its partially duplicated pelvis.

Unfortunately the extensive dilatation of the pelvis in this case gave a pyelogram (Fig. 3) in which all detail of calyx configuration was obliterated, there appearing on the plate only large overlapping shadows of bromide solution. There is an apparent folding and possibly an unfilled groove at the uretero-pelvic junction. Such folding and filling defect, however, probably is of late occurrence in the process.

It was possible to compare the configuration of this pelvis, as seen after removal of the kidney, with the pyelogram of a previous case of anomalous renal artery obstruction. This patient had been operated on at a much earlier stage and before any appreciable dilatation had taken place. Severe and persistent painful symptoms over a period of five months and apparently characteristic of upper urinary tract stasis led to a kidney exploration. All available measures had excluded a diagnosis of calculus. Ureteral dilatations on the suspicion of a ureteral stricture had failed to give relief and symptoms persisted after clearing up by lavage a mild pyelitis which had been present. At operation two sets of renal vessels were found, one set entering the upper angle of the hilum and one set entering the lower angle. The latter vessels crossed and lay in intimate contact with the uretero-pelvic junction. Unfortunately this patient's convalescence was marred by the formation of a perinephric abscess which was incised and drained. There was complete relief of symptoms.

Re-inspection of this pyelogram (Fig. 4) for purposes of comparison with the pelvic outline found by dissection in the later case showed a tendency to duplication of the pelvis. The definiteness of the anomaly, however, was by no means striking. It was scarcely comparable to the almost complete duplication seen in the latter case. Nevertheless it was now felt that possibly this feature of the pyelogram might have some significance in connection with the occurrence of anomalous vessels. Any filling defect or folding at the uretero-pelvic junction which might have been present would not show because of the presence of the catheter in the ureter.

Figure 4. Second case cited. Pyelo-ureterogram showing a tendency to division (reduplication) of the pelvis into rudimentary upper half and more nearly normal lower half. No defect at the uretero-pelvic junction is evident; possibly due to the splinting effect of the catheter which had not been withdrawn.

A third case afforded additional opportunity for observation. This patient had complained for two years of vague pain in the upper right part of the abdomen without typical radiation, but subject to

periods of considerable severity. There was tenderness in the right costo-vertebral angle. The pyelogram (Fig. 5) showed a partial duplication of the pelvis into a rudimentary upper half and more

Figure 5. Third case cited. Pyelo-ureterogram showing a rounded bulging true pelvis with partial duplication into small upper portion and larger lower portion. Overlapping or grooving of the uretero-pelvic junction is evident. Early hydronephrosis.

nearly normal lower half. Superior, middle and inferior calices were given off from each division and the whole pelvis showed a moderate degree of dilatation. Deformity at the uretero-pelvic junction was present, but its nature was not evident. A diagnosis of obstruction at this point due to anomalous renal artery was made on the basis of the partial duplication, of the pelvis, though it must be said without absolute confidence. At operation an anomalous set of vessels entering the mesial surface of the kidney, just below the lower angle of the hilum, was found. (Fig. 6.) They lay in intimate contact with the ureter, which they crossed just below the pelvis. At the point of contact the ureter was grooved and the dilated pelvis bulged above the constriction. Division of these vessels gave complete relief of symptoms.

A fourth case represented a much earlier stage in the process. The patient had experienced but one protracted attack of fairly typical pain which had lasted for five weeks and was still present. There had been slight bladder irritability. The only positive physical finding was tenderness of the right flank. The pyelogram (Fig. 7) showed a tendency to duplication of the pelvis. Again there was the rudimentary upper division and more nearly normal lower division each giving off its calices. An unequivocal diagnosis of upper urinary tract stasis due to anomalous renal artery was made. At operation three separate arteries were found entering the hilum of the kidney. They were followed medially a distance of 3 or 4 cm., but were not found to join a common trunk. The vessel entering the lower angle of the hilum lay in intimate contact with the uretero-pelvic junction, but there was no groove and the pelvis did not bulge over it. Division of the vessel gave immediate and complete relief of symptoms. The day following operation the patient was able to say that she was completely free of the pain which had been constantly present during the previous five weeks.

These four cases are all examples of the same pathologic process. The ages of the four patients at the time of their first symptoms were nineteen, thirty-two, thirty-three and forty-six years. In all of them pain was the chief symptom. In three there was quite well localized tenderness in the flank though in none was a palpably enlarged kidney demonstrated. In two there were no urinary symptoms while in the others frequency of urination was noted. Pus cells in the urine varied in the four cases from a few to none at all. *X*-ray ex-

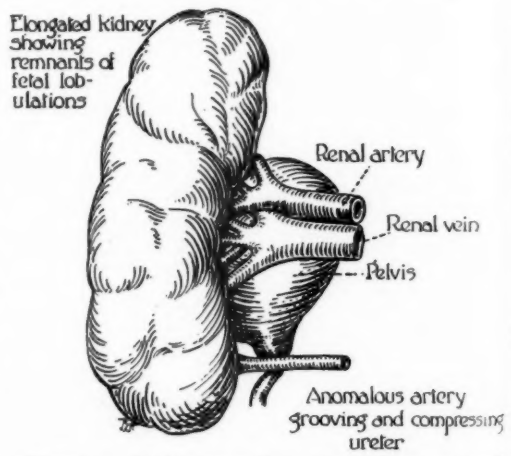

Figure 6. Third case cited. The kidney as found at operation, showing the contact of the anomalous vessel with the ureteropelvic junction. (Both a vein and artery were present; only the artery is shown in the sketch.)

amination of the uninjected kidney was negative in all.

This clinical picture conforms fairly well with that drawn by Quinby[4] for anomalous artery ob-

struction and based on a series of cases with full and carefully taken histories. The picture is simply one of pain fairly well localized to the vicinity of the kidney and exhibiting a tendency to periodically increased severity together with definite tenderness in the flank. Except for these positive things the four cases presented little else in common. With such symptoms however the absence of stone, ureteral stricture or persisting infection and negative cystoscopic examination might be mentioned as significant negative findings common to all.

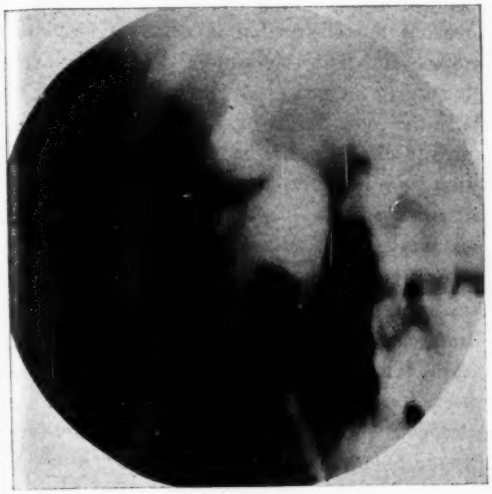

Figure 7. Fourth case cited. Pyelo-ureterogram showing slight dilatation of the pelvis. The terminal irregularities of the upper calices are well preserved. The apparent poor filling of the upper ureter may be due to decreased density of overlying gas in the intestine. The upper margin of this area of decreased density, however, corresponds to the position of contact of the anomalous vessel found at operation. Note the distinct tendency to duplication of the pelvis into small upper portion and larger lower portion. Compare with Figures 4 and 6. This relationship as to size of the upper and lower portions is the rule even with complete duplication including the whole pelvis and ureter, the upper portion usually being rudimentary.

The degree of pelvic dilatation shown in the pyelogram was roughly proportionate to the duration of symptoms. In the first and third cases described symptoms had been present for six and twelve years respectively. In these the pyelogram showed, in the first, a well advanced hydronephrosis and, in the third, a well marked dilatation of the pelvis. In the other two symptoms had been present for a few months in one and a few weeks in the other. Only slight pelvic dilatation was evident in one.

In all four cases there was some degree of duplication of the pelvis varying from almost complete duplication to only a tendency to this anomaly. In two of the cases this feature of the pyelogram together with the general clinical picture of upper urinary tract stasis led to correct diagnosis before operation.

The finding of an anomalous rental artery as the cause of obstruction in all four cases came after other causes of obstruction had been excluded to the extent that they can be by modern methods in urology.

Figure 8. For comparison. Pyelo-ureterogram. Normal pelvis and ureter.

Figure 9. For comparison. Pyelo-ureterogram. Distinct partial duplication without evident pathologic change. (Case of spontaneously passed minute calculi.)

It is not intended to give the impression that a tendency to duplication of the pelvis is thought pathognomonic of anomalous renal artery obstruction. It is possible to sharply distinguish between

Figure 10. For comparison. Pyelo-ureterogram. Bizarre type of renal pelvis. Possibly a tendency to duplication. Symptoms of upper urinary tract stasis.

the ideally normal pelvis (Fig. 8), perfectly formed and giving off superior, middle and inferior calices and the one showing partial division of the true pelvis into two halves each of which gives off separate calices (Fig. 9). Between the two, however, there are all gradations varying from a slight over-size of one major calyx to bizarre forms in which there is a tendency to duplication with usually one division rudimentary and the other predominant (Figs. 10 and 11). For these reasons duplication is necessarily a variable feature and relative term. Furthermore, while embryology gives good reason why vascular anomalies should follow pelvic anomalies the sequence is not invariable.

As mentioned above most of the cases of anomalous artery obstruction to be found in the literature describe fairly well advanced hydronephroses, many requiring nephrectomy. The explanation of this is not that these cases seek medical advice only in the late stages of the process, but that they are not recognized when first seen. In its early stages an obstructed point in the ureter from the contact of an anomalous artery is peculiarly difficult to demonstrate. It is a deformity or collapse from pressure without alteration of structure. There is no point of narrowing to obstruct the passage of a catheter or to be felt with a bougie. There is no kinking of the ureter demonstrable by alterations in its course. The fluid injected for pyelography may sufficiently overcome the pressure to permit enough filling to obscure the collapse. For these reasons the obstruction is not recognized and if severe and typical symptoms do not force resort to surgery the process is allowed to go on. Eventually the later effects of obstruction are exhibited: greatly dilated pelvis, marked impairment of function and possibly infection. Exploration or nephrectomy is now warranted and refinements of diagnosis are of no practical value.

Cases exhibiting none of these extensive changes and well classified under the term "upper urinary tract stasis" present a very difficult problem in diagnosis. The feature of the pyelogram which has been described may be taken as *a criterion for the probable presence of an anomalous arrangement of the renal blood vessels.* Together with the absence of other demonstrable causes of obstruction

Figure 11. For comparison. Pyelo-ureterogram. Bizarre type of renal pelvis. The superior calyx is not well shown. It extends up over the twelfth rib, is distinctly oversized and possibly represents a tendency to duplication. Appendectomy for "Chronic Appendicitis." Symptoms of upper urinary tract stasis persist.

and a conforming clinical history it permits a diagnosis of obstruction from this cause to be made with reasonable assurance and before extensive damage has taken place.

REFERENCES

1. Rayer: Traité des maladies des reins, 1842.
2. Roberts, William F.: Urinary and renal diseases, Fourth Edition, Philadelphia, 1885.
3. Geraghty, J. T., and Frontz, W. A.: A study of primary hydronephrosis. Jour. Urol., 1918, vol. 2, page 161.
4. Quinby, W. C.: Hydronephrosis. Jour. Urol., 1923, vol. 10, page 45.
5. Mayo, W. J., Braasch, W. F., and MacCarty, W. C.: Relation of anomalous renal blood vessels to hydronephrosis. Jour. Am. Med. Assn., 1909, vol. 52, page 1382.
6. Braasch, Wm. F.: Pyelography, page 130, Phila., 1915.
7. Sanes, K. I.: Ureteral obstruction. Jour. Am. Med. Assn., 1922, vol. 78, page 475.
8. Sanes: Personal communication.
9. Crabtree, E. G.: Early hydronephrosis associated with aberrant arteries. Reports of Meetings, New England Branch, American Urological Society, 1922-23.

DISCUSSION

Dr. Gilbert J. Thomas, Minneapolis: I am very much interested in the paper which Dr. Foley has presented. I have observed a rather large number of hydronephroses due to anomalous blood vessels. In my experience high obstructions in the ureter not caused by stone or demonstrable infection are caused by anomalous renal vessels. I have not observed the anomalies of the kidney pelvis in conjunction with anomalous renal vessels.

If Dr. Foley's observations are correct, he has given us additional data which will greatly assist in making an early diagnosis of hydronephrosis caused by anomalous blood vessel. In looking over the records of my recent cases, I find one which parallels Dr. Foley's reports. The lantern slide will show a pyelogram of the kidney. There are two pelves, one above the other, with no apparent communication. This is probably a double kidney. The lower pelvis is an infected hydronephrosis. The upper pelvis is not normal in outline although it is not pathological for anomalous or double kidney. The history in brief is as follows: Patient, female; age, 62 years. Three or four years ago a small lump was felt in the left flank. This was not painful and there were no other symptoms. About a year ago patient had a severe pain in her left flank and at this time the tumor seemed to enlarge. About three or four weeks ago she was seized with another attack of pain and the tumor again enlarged so that it was easily palpable. With the cystoscope we found two ureters on the left side, both of which were catheterized. I was unable to introduce the catheter into the lower pelvis, although sodium iodide could be forced into it. When we operated we found a large fluctuating mass which was somewhat adherent and which filled the entire flank and extended into the bony pelvis. With a trocar the contents of the tumor were aspirated and found to be infected fluid or urine. Slightly less than two quarts of this fluid was obtained. The ureter which opened into the lower end of the large pelvis was not small. About one-half inch below its exit, it was crossed anteriorly by a blood vessel about twice the size of lead in an ordinary pencil. This vessel held the ureter against the distended pelvis. The vessel itself did not produce a kink where it crossed the ureter, but held it tightly against the pelvis so that the ureter in making a right angle turn just as it made its exit from the pelvis, was distinctly kinked. That part of the ureter above the vessel might have grown forward and downward so that a kink may have occurred where the vessel crossed. I think the obstruction in the ureter in these cases is caused by the ureter falling or growing over the vessel as a soft rubber tube might hang over a line and thus produce a kinking. Because of the poor condition of the patient, we were unable to dissect the complete blood supply to this double kidney. However, the ureter which drained the upper pelvis was free. Because of our inability to isolate the blood supply to the upper kidney, a total nephrectomy had to be done.

Dr. William F. Braasch, Rochester: In 1907 Dr. W. J. Mayo, together with Dr. MacCarty and myself, published a paper calling attention to the fact that anomalous renal blood arteries were a frequent cause of hydronephrosis. My urological friends have frequently questioned me on this subject, saying that they seldom, if ever, could find that anomalous blood vessels were the etiologic factors. I am glad that Dr. Foley in this very able paper could corroborate the frequency of this factor in the cause of hydronephrosis. I am certain that if surgeons would stop and look carefully for the cause of hydronephrosis, the anomalous blood vessel would be found more frequently. I have often seen Dr. Mayo stop and search for several minutes before he found the etiologic factor.

It is particularly of interest that anomalous blood vessels can be a factor in causing hydronephrosis, since they occur so often without obstructing the ureter. It is difficult to ascertain why they should constrict the ureter in some cases and not in others. In some cases at least it is found that the kidney assumes a position so as to permit of such ureteral obstruction.

There are, of course, a number of other causes of hydronephrosis and it would be very difficult to differentiate clinically between the various etiologic factors. Suffice to say that hydronephrosis resulting from anomalous blood vessel obstruction usually occurs in the younger adult and at the time that they attain their greatest anatomic development; in other words, between the ages of fifteen and twenty-five. It has been my experience that it is rather difficult to determine the exact etiologic factor by means of pyelography. Fortunately, it is not of much practical importance to do so, the main problem being to determine the existence of pelvic dilatation.

I would also call your attention to the fact that a pyelogram is not always necessary in the diagnosis of hydronephrosis. In fact, it should not be made where the diagnosis can be made without it, because every now and then, no matter what medium we use, if it is allowed to remain in the dilated renal pelvis, cortical abscesses may form. If the diagnosis can be made by means of withdrawing several ounces of residual urine from the renal pelvis through a ureteral catheter, there would be no object in making a pyelogram.

Probably the most practical factor for your consideration in Dr. Foley's paper is the comparatively frequent incidence of hydronephrosis. The condition is frequently and easily overlooked in the course of a general clinical examination because the urinary findings are negative in a large percentage of cases and the patient may have no urinary symptoms. Furthermore, the pain radiation is not necessarily suggestive of renal involvement and is in fact frequently more anterior than posterior. As a result, a large proportion of patients with hydronephrosis on the right side have had their appendix removed.

I wish to call your attention to the fact that with every lateral abdominal pain which is localized above the level of the umbilicus we should be very careful to rule out hydronephrosis. At the Mayo Clinic every patient that has an upper abdominal pain which is not otherwise identified by clinical data is referred to the urologist to rule out the possibility of hydronephrosis. This is probably one reason why we find so many cases of hydronephrosis annually. As I have said before, Dr. Foley is to be congratulated on the very careful study he has made of this interesting condition.

Dr. William J. Mayo, Rochester: Dr. Foley has made a real contribution to this subject. The first case of this type in which I operated was dramatic. In drawing up an infected hydronephrosis I didn't recognize an artery running into the lower pouch. These arteries usually run across in the vicinity of the uretero-pelvic juncture, and then well up on the posterior wall of the kidney. I cut this vessel and it dropped back and started a very smart hemorrhage. I finally traced the source of the hemorrhage, well down on the aorta. It was an entirely separate blood vessel and did not come off with the renal vessel.

Dr. Braasch has brought up a question of importance relating to the surgical phase: In what stage of hydronephrosis and with what amount of infection should we attempt to save the kidney? We have had some very interesting experiences in this respect. When I was abroad just before the war, I was asked to open a discussion on tuberculosis of the kidney. One of the most distinguished of the older members of the surgical profession of the country had given a detailed report of seven cases of tuberculosis of the kidney in which the bacillus of tuberculosis, and all the classical symptoms had been noted. These had afterward all disappeared, some without treatment, and some with treatment. The assumption was that for this reason tuberculosis of the kidney had existed, but that the patient had entirely recovered. However, there had been no cystoscopic examination made to show that there was urine coming from the affected side. My inference was that there was a dead kidney on that side, that is, a closed kidney without function, but still tuberculous.

The same point comes up in connection with hydronephrosis. Christian Fenger, who initiated the work on these structures at the uretero-pelvic juncture, and did not, at that time, recognize the relation of an anomalous artery to many of these conditions, was under the impression that an attempt should be made to save every kidney. Now the situation appears to be about this: if there is a perfectly good kidney on one side and a poor kidney on the other side, if something is done to the poor kidney, for instance a procedure for relief of an obstruction which will relieve the patient of the immediate symptoms, it creates the belief that the kidney is functioning. Yet examination in the course of time will often show that there is no function on that side. If both kidneys are diseased and operation is performed on one kidney and it is saved, so long as function is necessary the poor kidney will continue to function. But if the kidney that has been operated on gets well, the second kidney will cease to function in a considerable percentage of cases. This is rather interesting because it shows nature's conservation in providing sufficient function. But if there is good function on one side and an advanced infected hydronephrosis on the other, even though an operation may relieve the patient of the pain and discomfort, it cannot be assumed, merely because the patient is relieved, that the kidney is functioning.

Dr. A. C. Strachauer, Minneapolis: Since Dr. Braasch called attention to the presence of these anomalous vessels, surgeons in seeking the cause of hydronephrosis have found that these vessels are of rather common occurrence. There is nothing uncommon about an anomalous vessel crossing the uretero-pelvic juncture and causing an obstruction. I do, however, want to call your attention to the fact that occasionally these vessels are obliterated, and instead of a vessel you find a cord, a cord so definite that you can snap it under the finger. The pyelogram may definitely show a grooving, in early cases; and the release of this, the division of the cord, of course accomplishes the same result that the division of the blood vessel would.

The pyelogram in these cases of obstruction due to either blood vessel or cord from the obliteration of the vessel, should be carefully studied. Occasionally it will be found that the uretero-pelvic juncture instead of being at the most dependent portion of the hydronephrosis sac has been carried up on the side; and there is a certain amount of residual urine in the pelvis. Under these circumstances, in my opinion, the kidney should be decapsulated and a nephropexy performed, the capsule used as ligaments. Care should be taken that no fat comes between the decapsulated kidney and the muscle along the last rib. The kidney is so fastened that its longitudinal axis is changed to a more transverse position, so that the urine drains into the ureter from the pelvis at its most dependent portion.

Dr. Arnold Schwyzer, St. Paul: I think I never saw as nice and clear an *x*-ray picture as in the first picture the Doctor showed us. The relief from the obstruction that one gets by the cutting of an abnormal artery is not always satisfactory. Though we have heard that a nephrectomy is the classical treatment for these conditions, I would like to take another standpoint. The trouble was that we had only the linear method of uretero-pyeloplasty, the methods of Fenger, Morris, etc. They all simply split the region where we had a stricture or had a kink and united transversely. We see in their illustrations there was a good deal of puckering and in the course of healing a fistula easily forms. In three cases I tried to improve on

that and I am sure I have. If you have a kink at the pyelo-ureteral junction, in releasing the parts from fixing strands you can always stretch it. I then make an incision, a Y-shaped one, with one of the three legs down through the strictured ureter and the other two in the pelvis of the kidney, spreading apart at an angle of 60 degrees. I can now take the flap between these two pelvic branches of the Y down to the end of the lower incision and leave the puckering in the wide part of the pelvis of the kidney. The opening was funnel shaped. In three such cases we had a satisfactory result—one case was not a very good one for the method. It had been operated upon elsewhere by dividing an abnormal vessel but had not had any relief. The relief as long as I could observe the case was marked; but I heard that the patient died a year later from a ruptured extrauterine pregnancy.

The other two cases were one in a young child and one in a young woman. I have not made a cystoscopic examination since, but the two cases have an absolutely clear urine and have had a complete recovery. I always feel that though the surgeon defends that a nephrectomy in these cases is right, he does not feel quite right just the same in the bottom of his soul, when he sees a healthy looking kidney cut out on the table even if this healthy kidney has a large pelvic sac. He cannot feel right.

Dr. Frederic E. B. Foley, St. Paul (closing): I wish to thank those who have discussed my paper for adding so much to its interest.

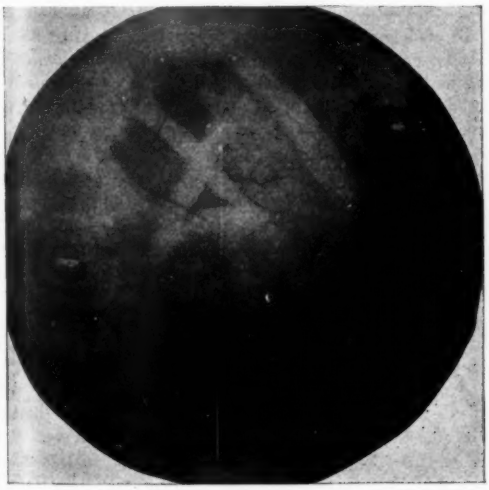

Figure 12. Case cited in closing discussion. Pyelo-ureterogram typical of the so-called bifid pelvis. Although representative of a type of pelvis generally considered normal, the embryologic fault which explains its configuration is doubtless the same as in the case of complete duplication.

If there is time available I will add very briefly another case to those presented in the paper. This patient was not encountered, or at least was not operated upon, until after the preparation of the paper.

A young woman 29 years of age. Ten years ago she had what was probably a Neisser infection; three curettements had been done for "endometritis." Tonsillectomy three years ago. Gall bladder and appendix removed two years ago. *X*-ray treatments of a small fibroid in cervix of uterus a year and a half ago.

Her complaint at the time of admission was of frequent painful urination and pain throughout the left side of the abdomen and in the flank. She gave a history of having had periods of this sort of left sided pain for several years. The present attack was the only one associated with bladder symptoms and these began during an attack of influenza before admission.

Physical examination was essentially negative except for very definite tenderness in the left costo-vertebral angle, and tenderness felt on palpation of the flank and along the course of the ureter. A small fibroid was felt in the anterior part of the cervix above the vagina. There were temperature elevations to 99° each day. Many pus cells in the urine.

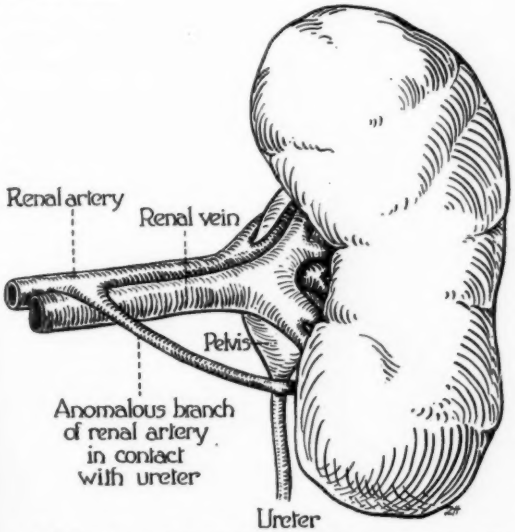

Figure 13. Case cited in closing discussion. The kidney as found at operation, showing the premature branching of the renal artery. The premature branch girdles the uretero-pelvic junction to gain access to the posterior lip of the sinus renalis.

On cystoscopic examination the trigone was seen to be reddened; there was inward displacement of the bladder floor just beyond the trigone due to the fibroid nodule in the cervix. No. 5 catheters passed without resistance on each side. The urine from the left kidney contained an occasional clump of pus cells.

Repeated bladder urine examinations for tubercle bacilli were negative and guinea pig inoculations of the ureteral catheter specimens were also negative.

Treatment consisting of forcing fluids, urinary antiseptics, bladder lavages and lavages of the left renal pelvis gave no persisting inmprovement. As a result of her distressing symptoms the patient had lost 40 pounds at the end of six months; with this weight loss the left sided pain had become worse. The left pyelogram which had been made at one of the early cystoscopies several months ago was recently re-inspected, figure 12 (shows slide). It shows a very definite partial duplication. A diagnosis of

upper urinary tract stasis due to anomalous renal artery was made. Figure 13 (shows slide) shows the arrangement of the anomalous artery as found at operation. There has been complete relief of the left sided pain since operation. The bladder irritation was relieved for a time but has recurred. It is believed that an infiltration of the bladder neck in relation to the small fibroid (possibly infected) is responsible.

This condition can be easily overlooked at operation unless the surgeon has in mind anomalous vessel as a cause of upper urinary tract stasis without hydronephrosis. The vessel at first is obscured by fat. This is removed and the vessel is seen but with the kidney drawn down into the incision it lies across the pelvis. Push the kidney up into normal position and immediately it is apparent that the vessel lies in very intimate contact with the ureter.

My experience with the diagnosis and treatment of cancer covers a period of almost thirty-one years and can be easily divided into four decades. The effect of the absence of any educational effort is most marked in the first decade up to 1900 and continued to almost 1910. The educational effort began in 1910. The effects were seen within a few years. They are most marked since 1920.

When we compare the results of our records in the first ten years up to 1900 with those since 1920, we may summarize them as follows:

These figures come from the Surgical Pathological Laboratory of the Johns Hopkins Hospital, where we have forty thousand records. These figures include all the cases treated in the Surgical Service of Johns Hopkins Hospital and of St. Agnes Hospital in Baltimore, and during the past five to eight years about one-third of the material has been received from outside sources. But from the very beginning there has been a large amount of material with good records received from physicians and hospitals throughout this country. Our records therefore pretty clearly show the falling curve of inoperability and the rising curve of five-year apparent cures and longer permanent cures.

This improvement is most marked in cancer of the mouth, skin and breast. It is beginning to be marked in cancer of the cervix. There is very little improvement in cancer of the stomach and colon.

Breast. In the first ten years inoperable cases registered almost 40 per cent. The per cent of cancer as compared with benign lesions was almost 80 per cent. The per cent of women seeking examination in whom nothing definite was found in the breast was less than 1 per cent. The per cent of five-year cures in operable cases registered about 20 per cent.

In my own clinic since 1920 the number of women seeking examination at which nothing definite is found has risen from less than 1 per cent to more than 50 per cent. Inoperable cases have fallen from more than 40 to 5 per cent while the per cent of cancer has fallen from 80 to 50 per cent. These changes are associated with the one controllable factor—the duration of the lump known to the patient. In the first ten years the average duration of the lump was almost two years. Since 1920 it has fallen to less than nine months. Our records show that women need no instruction, as to the warning of trouble with the breast. With rare exceptions they are warned in time—they feel the lump, observe the retracted nipple, or the dimpled skin, but they need education to *act* in time.

Tongue. In the first ten years but one patient sought the advice of the clinic for a lesion of the tongue which was not cancer—about 3 per cent. Today, in my own clinic more than 70 per cent come under observation with leucoplakia, areas of irritation, ulceration, ragged dirty teeth—that is in the stage before cancer has developed, and a period in which cancer can be prevented by the removal of the irritating factors—tobacco and ragged, dirty teeth.

This is the most remarkable effect of the educational effort. In addition, inoperable cases have decreased, and early cancer of the tongue with a probable cure of almost 70 per cent has increased.

Up to the present time the educational efforts have been carried on by a very small minority. There seems no difficulty in getting space in the daily press or magazines, but the efforts are more or less sporadic. It does not seem to be a question of writing the message to the people so it will be read—it seems to be largely a question of multiplying the number in the Medical and Dental Professions who will aid in the teaching efforts and of increasing their efficiency in this new and very essential part of the practice of Medicine.

To eradicate disease such as cancer there must be a very efficient organization. Some diseases can be eliminated by providing good water and food; others can be prevented or cured by a serum. But there is no treatment that offers much for late cancer, and there seems to be no way of getting cancer under treatment in its earliest stages, except by getting to the people a definite, clear-cut message. We must also remember that cancer of the mouth and of the skin, and perhaps cancer of the cervix, are preventable diseases. A cancer of the breast without involvement of the axilla offers 70 per cent chances of a cure, while with the involvement of the axilla this falls to 20 per cent. The duration of the indigestion or discomfort known to the individual in cancer of the colon and stomach is far too long before the thorough examination with the *x*-rays. My recent evidence shows that many cancers of the colon originate in benign polypoid growths. These growths give definite symptoms in the benign stage and can be felt with the finger, can be seen with the proctoscope, or outlined with the *x*-rays. In this stage the only failure to cure would be due to operative mortality.

It is therefore the obligation and opportunity of members of the Medical Profession who are also members of the Society for the Control of Cancer to bring these life-saving facts to their own patients, their own colleagues and their own communities.

Sincerely yours,

JOSEPH COLT BLOODGOOD.

From a letter to the New York Committee of the American Society for the Control of Cancer.

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EDITORIAL

Life Insurance Examiners

In this issue of MINNESOTA MEDICINE appear four articles by medical directors of four of the leading life insurance companies of America. The presentation of these addresses was suggested by Dr. C. N. McCloud, Medical Director of the Minnesota Mutual, in an effort to acquaint the profession of Minnesota with some medical facts in regard to life insurance. That such a ready response was forthcoming on the part of four large insurance companies to the request of a county society located in the middle West, is significant of the appreciation on the part of the companies represented of the need of a better understanding of the insurance viewpoint by physicians.

A large percentage of the profession examine for one or more life insurance companies. An enormous sum is paid yearly to the medical profession for services in this connection. Nevertheless few physicians as a matter of fact ever acquire the insurance viewpoint and make good examiners. There is a tendency on the part of the average examiner to slide over certain questions which to him seem absolutely useless and do rather slipshod work.

There is some excuse for the impatience in filling out forms often manifest. Many of those we are required to fill out in connection with insurance work of various kinds are needlessly long and exacting, at times to the point of absurdity. It can be safely said, however, that the medical application blanks of the large insurance companies have been evolved after years of experience and pretty carefully boiled down. Several questions are necessary purely from a legal standpoint. The questions regarding the use of alcohol are in point. Dr. Wenstrand's article showing the actuarial statistics in light, moderate and heavy drinkers are doubtless illuminating to most of our readers. The actual influence on life expectancy is doubtless greater than shown in the chart mentioned for it is human nature to minimize one's questionable habits when applying for life insurance.

We recommend the reading of these insurance articles by all those interested in this kind of medical work. This phase of medical activity has been neglected in the past. Who knows but that the Ramsey County Medical Society has blazed a trail which will be profitably followed by other and larger societies.

State Boards

The intention primarily in inaugurating State Board Medical Legislation was the raising of the standards of the medical colleges, and only secondarily, of necessity, the improvement of the medical personnel of the profession as represented by the graduates of these colleges.

When medical legislation started some thirty-five or forty years ago, medical colleges were in the main commercial institutions. No preliminary demands were made in reference to mental training. Some of the better colleges named a high school course as a requisite, but it was not a rigid requirement. Only a meagre few demanded more than two terms of barely six months each in medical college before granting a diploma as an M.D. Commercialism was the rule, quantity production the desire, and quality not considered. At one time the United States had one hundred and seventy-five medical schools, more than all the rest of the world.

The spring school poison was also injected into the unfortunate condition of medical affairs, so that it was possible for an illy educated individual often with barely grammar school preliminaries to enter

a so-called medical school in October, remain until March, enter a spring school, graduate in June and be a legal M.D. Instances of this kind were numerous. The conditions became intolerable.

Some of the forward looking medical men in Minnesota studied the question, and concluded that some form of legislation was essential and the fundamental starting point was in the changing of medical college standards. The law of 1887 was evolved and three years of at least six months each in a recognized medical school was demanded of each applicant for examination. This met with violent opposition by the medical schools and two of our now foremost institutions began suit to test the constitutionality of the law. The law, however, was executed without favor and gradually all medical schools adopted the three-term standard. Improvement in methods and development in medical knowledge made more time in medical school necessary to grasp enough knowledge for efficiency, so that in 1899 the law was changed to demand four terms in medical college. The colleges all came up to this standard in time. Not until 1912 was the preliminary demand of two years in a College of Liberal Arts over and above a high school course, put in operation. These demands are now made by all Class A colleges.

A provision in the Minnesota Law divorced the personnel of the board entirely from any medical school. No person connected with a medical school could be a member of the Board.

The law should be as brief, mentioning only main principles. Many laws are so filled with detail the board cannot function unless every act is mentioned in the law. There should be some reserve power left for the board to cover any new issue that the passage of time may bring forth.

The different medical cults have caused much confusion in the control of medical legislation. The danger to the public in this lowering of medical standards has not been appreciated by the people. The law is intended for the benefit of the people and not for the medical men as a class. This should always be made prominent, as many assume that it prevents their exercising their liberty of choice as to who shall treat them and how they shall be treated. With the basic fact established that the law intends only to cover the fact of proper educational qualification, both as to certain necessary preliminary education and a high grade medical education, the manner or method of treatment can be left entirely as a matter of choice. The question of the standardizing of the qualification of all who treat the sick is basic and will eventually prevail. As a compromise many states are attempting to function with a conjoined board, all kinds of treatment being represented on one board. This is a mistake and can only be carried out by lowering the general standards of medical qualification and confusing the public. While the recognizing of each cult by a board is to be deplored, that is far better than the conjoined board. They have to stand or fall by what they deliver to the public and should not be dignified by association with those who have genuine medical and primary training. Three or four standards of qualification in one law have been found most undesirable. Many cannot disassociate medical treatment from a species of necromancy or miracle working, while long training and deep study on the part of the medical man is the only method of making a safe and sane practitioner. This basic fact accepted, there is no place for the conjoined board.

T. McD.

Doctor of What?

"Once upon a time many years ago, when our grandfathers were little children, there was a doctor; and his name was Doolittle—John Doolittle, M.D. 'M.D.' means that he was a proper doctor and knew a whole lot."

So begins one of the popular Doolittle books and the above furnishes a suitable text for some cogitations. Once upon a time the title of doctor meant something. It signified as a rule some attainment in the field of medicine or the ministry. Not so now. Any one of a variety of duly licensed institutions may dispense a degree of doctor of this or that. And with the recent influx of quasi-medical doctors such as naturopaths, chiropractors et al, the title of doctor has come to carry with it a certain amount of opprobrium.

The title doctor may designate a clergyman, D.D.; physician or surgeon, M.D.; professor, Ph.D., D.D., or LL.D.; dentist, D.D.S.; veterinary, V.M.D.; osteopath, D.O.; chiropractor, D.C.; naturopath, N.D.; et cetera ad nauseum, and is anything but discriminating. The recent disclosures of the "diploma mills" have only served to further depreciate the term doctor, so much so that we are informed the California state board of medical examiners is contemplating legislation to abolish the

term doctor entirely and to require the use of the initials, M.D., D.D., and so forth. More legislation, and fantastic legislation at that; for, unless nationwide, no relief for the situation will be afforded.

There seems to be no word in the English language which quite designates the M.D. The word physician is not ordinarily used to include the surgeon. The phrase "physician and surgeon" is too cumbersome. In England the surgeons are plain Misters.

We shall probably never shake off our doctor titles. While the M.D. stands for doctor of medicine, and few of us would want to be known primarily as prescribers of medicine, the initials represent our degree and should be more generally used. We would bequeath without a tear the abbreviated title "Doc" to any or all of the many present day half doctors.

OBITUARY

DR. JAMES McAULIFFE

Dr. James McAuliffe of Duluth died at the age of 66 years at St. Mary's Hospital, Duluth, March 23, 1924.

Dr. McAuliffe was born at Olean, New York, where he spent his early years. He was graduated from Buffalo Medical College, Chicago, and took a post-graduate course at Bellevue Hospital, New York, specializing in eye, ear and nose diseases. In 1887 he came to Duluth and practiced there until the fall of 1922, when he suffered a stroke while out hunting.

He had been confined to the hospital practically ever since, with the exception of a short time when he was able to leave and reside in his rooms at the Lenox Hotel, where he had made his home for a number of years.

Dr. McAuliffe was a member of the local council of Knights of Columbus, in which he took an active part for a number of years. He was the examining physician for Duluth for the order for many years. He was also deputy coroner and acted as coroner during the late war, when Coroner Charles F. McComb was away in service. He was a member of his county and state medical associations.

Surviving are his son, James, and a brother, John J. McAuliffe, Duluth, and five brothers and two sisters in Olean, New York.

The following tribute paid Dr. McAuliffe through the columns of a home paper gives evidence of the esteem in which he was held in his own community:

"In the passing of Dr. McAuliffe Duluth has lost one of its finest citizens. He died richer in friendship than most men, through his skill as a physician and surgeon, his self-sacrifice for others and his devotion to the welfare and happiness of the members of the circle within which he lived. He died poorer in worldly possessions than most men, because of his honesty, his self-sacrifice and his willingness to serve the poor and the little ones in this world without pay, at any time during night or day, no matter what conditions existed.

"In his kind, benevolent way, he exemplified the highest ideals of that church to which he belonged. He was a servant and follower of Jesus Christ, and he gave unstintingly of himself and of what little he possessed to those in need. The cheer and the comfort that he brought in the home of sickness and death will never be forgotten by those who knew him and whom he served.

"As a physician he occupied a position attained by few. He was careful, reliable and efficient, and his standing among his brother physicians was unequaled. Doctors Charles and Will Mayo of Rochester considered him most reliable, and his word and diagnosis were taken by them as authoritative. He was considered one of the most reliable and dependable physicians in the St. Louis County Medical Society."

DR. O. K. EGGEN

Dr. O. K. Eggen was born in Levanger, Norway, in 1882 and came to America with his parents at the age of three. He attended the Red Wing Seminary for four years and Hamline University two years, before going to Philadelphia for his medical work at the Jefferson Medical College, where he was graduated in 1909.

After this he began practice in Minneapolis, where he had remained ever since, being on the staff of St. Mary's Hospital. He was an office associate of Dr. Joe M. Neal.

Dr. Eggen married Miss Anna Hart in 1914. Her death occurred one year ago. Dr. Eggen was a member of the Court of Honor Lodge and of the County and State Medical Societies and the American Medical Association.

On March 26th he was struck by an automobile and died the next day as the result of his injuries. He is survived by three sisters, Mrs. Glaeser of Minneapolis, Mrs. Orstad and Mrs. Mortret of Ottawa, Iowa, and by two brothers, John and Carl Eggen of Edmonton, Canada.

DR. LYMAN P. FOSTER

Dr. L. P. Foster, 88 years old, a resident of Minneapolis since 1848 and one of the oldest practicing physicians in that city, died at his home in April, 1924.

Dr. Foster was born in Pittsburgh, November 5, 1836, and with his parents came to St. Anthony Falls in 1848. In 1853 he attended the first session of the University of Minnesota. He had lived in Minneapolis continually since that time, remaining active in his practice until a few weeks before his death.

Graduating from Duff's College, Pittsburgh, in 1856, Dr. Foster returned to Minneapolis and in 1858 was admitted to the Minnesota bar, beginning practice as an attorney in 1860 at St. Anthony Falls. In 1873 he attended Rush Medical College and Hahneman Medical College, both in Chicago. He was assistant professor at the Hahneman College in 1881 and 1882.

For many years Dr. Foster was active in church work. He was ordained an elder in the Methodist Episcopal Church in 1874.

Surviving are his widow and four daughters.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

SOUTHERN MINNESOTA MEDICAL ASSOCIATION

OFFICERS

Dr. F. P. Strathern, St. Peter, president.
Dr. C. J. Holman, Mankato, first vice-president.
Dr. A. Gullixson, Albert Lea, second vice-president.
Dr. H. T. McGuigan, Red Wing, secretary-treasurer.

Program Committee

Dr. H. W. Meyerding, Chairman, Rochester.
Dr. F. C. Heise, Winona.
Dr. F. R. Huxley, Faribault.

Executive Committee

Dr. W. F. Braasch, Chairman, Rochester.
Dr. J. W. Andrist, Owatonna.
J. S. Holbrook, Mankato.

Committee on Arrangements for Mankato Meeting

Dr. J. T. Schlesselman, Chairman, Mankato.
Dr. C. C. Pratt, Mankato.
Dr. A. G. Liedloff, Mankato.

The annual meeting of this association will be held at Mankato, Monday, May 19, 1924. The scientific program will be called at 8:00 A. M. The annual business meeting will take place at 5:30 P. M. Following the banquet at 6:30 P. M. the association will be addressed by Dr. Dean Lewis, of Chicago, and Dr. W. J. Mayo.

Members of the profession are invited to attend the meetings and provision is being made to entertain visiting ladies.

Dr. J. T. Schlesselman, Mankato, has charge of hotel and banquet reservations.

The following interesting program has been arranged:

1. Radium in Benign Conditions of the Nose and Throat. Dr. Laura A. Lane, Minneapolis. Discussor: Dr. B. E. Hempstead. Rochester.
2. Laryngeal Obstruction in Acute Infectious Disease. Dr. S. W. Adler, Winona. Discussor: Dr. Walter Ramsey, St. Paul.
3. Intussusception in Infancy. Dr. W. B. Grise, Austin. Discussor: Dr. F. C. Rodda, Minneapolis.
4. The Role of Diet in the Treatment of Disorders of Older Children. Dr. Frederic Wm. Schlutz, Minneapolis. Discussor: Dr. H. F. Helmholz, Rochester.
5. Hypertension: An Index to Toxemia of Pregnancy. Dr. R. D. Mussey and Dr. L. M. Randall, Rochester. Discussor: Dr. J. C. Litzenberg, Minneapolis.
6. Some New Problems in Obstetrics. Dr. W. H. Condit, Minneapolis. Discussor: Dr. John L. Rothrock, St. Paul.
7. Factors in Operability of Acute Appendicitis. Dr. W. P. Finney, Rochester. Discussor: Dr. A. C. Strachauer, Minneapolis.
8. Pre-operative and Post-operative Care of Surgical Patients. Dr. A. E. Sohmer, Mankato. Discussor: Dr. W. W. Walters, Rochester.
9. Treatment of Nasal Deformities. Dr. G. B. New, Rochester. Discussor: Dr. Carl Waldron, Minneapolis.
10. Osteo-Chondral Grafts to Skull. Dr. A. M. Hanson, Faribault. Discussor: Dr. A. R. Colvin, St. Paul.
11. Foreign Bodies in the Esophagus and Air Passages. Dr. P. P. Vinson, Rochester. Discussor: Dr. K. A. Phelps, Minneapolis.
12. Pneumonia and Its Treatment with Pneumococcus Antigen. Dr. D. B. Pritchard, Winona. Discussor: Dr. E. C. Rosenow, Rochester.
13. Clinical Aspects of Coronary Sclerosis. Dr. F. A. Willius, Rochester. Discussor: Dr. J. S. Gilfillan, St. Paul.
14. Hip Fractures. Dr. A. G. Liedloff, Mankato. Discussor: Dr. H. W. Meyerding, Rochester.
15. Injuries of the Carpal Bones. Dr. Emil S. Geist, Minneapolis. Discussor: Dr. C. C. Chatterton, St. Paul.
16. Treatment of Burns. Dr. Arthur Collins, Duluth. Discussor: Dr. A. W. Ide, St. Paul.
17. The Value of Proctology in General Practice. Dr. L. A. Buie, Rochester. Discussor: Dr. W. A. Fansler, Minneapolis.
18. *X*-ray Therapy on Some Common Skin Diseases. Dr. A. J. Wentworth, Mankato. Discussor: Dr. W. H. Goeckerman, Rochester.
19. Surgical Treatment Non-tubercular Pulmonary Suppuration. Dr. C. A. Hedblom, Rochester. Discussor: Dr. F. W. Wittich, Minneapolis.
20. Role of Iodine in Prevention of Goitre. Dr. Henry S. Plummer, Rochester. Discussor: Dr. C. H. Mayo, Rochester.

MINNEAPOLIS CLINIC WEEK

Minneapolis Clinic Week will be held Tuesday, Wednesday, Thursday and Friday, May 6, 7, 8 and 9, with headquarters at the Radisson Hotel. The first two days, May 6 and 7, will be devoted to dry clinics to be held in the Unitarian Church, Eighth St. and La Salle Ave. The following days, May 8 and 9, will be devoted to clinics at hospitals from eight o'clock until noon. The afternoons will be given over to the presentation of dry clinics in the Gold Room at the Radisson Hotel. Any physician from outside the Twin Cities may send in his patient for a dry clinic demonstration.

Minneapolis Clinic Week is to be closely associated with the Minneapolis Health Exposition which will be in operation from May 3 to 12 at the Armory Building, Minneapolis, where the various phases of public health work, educational work related to public health measures, and commercial exhibits related to both will be carried on.

The Annual Banquet given by the Hennepin County Medical Society will take place the evening of Wednesday, May 7th, at the Radisson Hotel.

ANNUAL HEALTH EDUCATION CONFERENCE

At the invitation of the Massachusetts Institute of Technology, a working conference in Health Education is to be held June 23-28 at Cambridge, Massachusetts. The conference called by the Health Education Division of the American Child Health Association will be limited to 100. Registration must be made in advance. Address Emma Dolfinger, 370 Seventh Avenue, New York City.

THE NORTHWESTERN MEDICAL OFFICERS' ASSOCIATION OF THE WORLD WAR

A meeting of the Northwestern Medical Officers' Association of the World War will be held Tuesday evening, May 6, 1924, at 6:30 o'clock at Schiek's Cafe, Minneapolis. The meeting will consist of a dinner to be followed by entertainment. The address of the evening will be given by Mayor George E. Leach, of Minneapolis. Any medical officer who saw service in the World War is eligible to membership in the Society and is urged to attend the meeting. Dr. Stanley R. Maxeiner, 301 Physicians & Surgeons Bldg., Minneapolis, is in charge of reservations.

SOUTHWESTERN MINNESOTA MEDICAL SOCIETY

The regular meeting of the Southwestern Minnesota Medical Society will be held Thursday, May 22, 1924, at Luverne, Minnesota. The program includes the following addresses.

President's Address—Dr. G. G. Balcom, Lake Wilson.

"Pyelo-Ureteritis of Pregnancy"—Dr. E. L. Perkins, Sioux Falls, S. D.

"Gastric and Duodenal Ulcer"—Dr. A. E. Booth, Minneapolis.

Case Report—Dr. L. M. Gerber Ditmeier, Jasper.

AMERICAN MEDICAL ASSOCIATION

The official call to officers, fellows and members of the American Medical Association for the annual meeting to be held this year in Chicago has been sent out.

The House of Delegates will convene on Monday, June 9th, the sections meeting Wednesday, Thursday and Friday morning, June 11, 12 and 13.

Minnesota's two delegates are Dr. J. L. Rothrock, St. Paul, and Dr. J. C. Litzenberg, Minneapolis, the alternates being Dr. J. F. Corbett, Minneapolis, and Dr. O. W. Parker, Ely.

LYMANHURST SCHOOL FOR TUBERCULOUS CHILDREN

The following program will be presented before a meeting of the Lymanhurst and Parkview medical staffs at the Lymanhurst School, Minneapolis, Tuesday evening, May 27, 1924, at 7:00 o'clock:

Twenty Years' Observation of Tuberculosis Control—Dr. E. L. Tuohy, President of the St. Louis County Tuberculosis Commission, Duluth, Minn.

Report of Von Pirquet Tests in 1,500 Children in a Minnesota Rural Community—Dr. S. A. Slater, Superintendent, Southwestern Minnesota Sanatorium, Worthington, Minn.

All persons interested in tuberculosis are invited to attend this meeting.

OF GENERAL INTEREST

Dr. and Mrs. Paul O'Leary have returned from San Antonio, where they spent the winter.

A class of twenty-four nurses was graduated from Eitel Hospital, Minneapolis, Friday evening, April 25.

Dr. and Mrs. C. Darcy Wright of Minneapolis have returned from Florida, where they spent the winter.

Dr. F. G. Kohler, formerly of Hector, is now located in Minneapolis, where he has opened offices in the McKnight Building.

Dr. P. P. Vinson, Rochester, spoke before the sectional meeting of the American College of Surgeons in Columbus, Ohio, March 24.

Dr. J. A. Wilkins, who has been at the Mayo Clinic for several years, has gone to Norfolk to enter the practice of internal medicine.

Dr. Gordon B. Kamman of Saint Paul is now associated in the practice of his profession with Dr. C. E. Riggs in the Hamm Building.

Dr. J. G. Meisser, who has been associated with Dr. Rosenow for several years, has left for Cleveland to work with Dr. Weston A. Price.

Dr. W. O. Ott, who was Dr. Adson's assistant at the Mayo Clinic, has announced his connection with the Harris Clinic of Fort Worth, Texas.

Dr. W. H. Hengstler, formerly of Saint Paul, is now in California, where he contemplates making a permanent location for the practice of medicine.

Dr. A. J. Clay of the Clinic of Drs. McGregor, Hanna and Clay of Fargo, N. D., has left for Barnes Hospital, St. Louis, Mo., where he will take a month's course in insulin treatment of diabetes.

Dr. F. W. Gaarde and Dr. R. M. Wilder, of Rochester, attended a meeting of the Billings Club in Chicago, April 1, at which the seventieth birthday anniversary of Dr. Billings was celebrated.

Dr. R. D. Carman gave a memorial address at the services held last month at Washington University for Dr. Walter Mills, with whom he had been associated in his earlier work with *x*-ray.

Dr. Carl M. Oberg, Minneapolis, left for Europe May 1. After a few weeks' travel in the Scandinavian countries, he will go to Vienna to attend the clinics there. Dr. Oberg expects to return in October.

Dr. A. A. Rankin, formerly of Waconia, is now located at Brownton, where he has taken over the practice of Dr. O. J. Engstrond. Dr. Engstrond is now associated in practice with Dr. E. H. Smith at Bemidji.

Dr. Paul D. Berrisford, Saint Paul, addressed the Washington County Medical Society at Stillwater, March 11, on the subject "Acute Infection of the Nasal Accessory Sinuses" with lantern slide illustrations.

Dr. A. W. Jones, of Red Wing, who has been a member of

the board of education of that city for fifteen years and president of the board for four years, has declined renomination and will retire at the May meeting.

Dr. M. F. Guyer, Professor of Zoology, University of Wisconsin, gave the fifth in the series of lectures on heredity under the auspices of the Mayo Foundation and its chapter of Sigma Xi, Friday, March 28. His subject was "Eugenics."

Dr. William Clark and his associate, Dr. Eugene J. Asnis, of Philadelphia, spent the week of April 7 to 14 in Rochester, and gave Mayo Foundation lectures on April 10 and 11 on electrodesiccation and coagulation in the treatment of neoplastic disease.

Dr. and Mrs. Orville N. Meland, formerly of Warren, now of Saint Paul, have returned from a trip abroad. They spent the winter in London, Paris and Vienna, where Dr. Meland attended the various clinics, and before leaving visited for six weeks on the Riviera and in the principal Italian cities.

Dr. Wallace H. Cole, Saint Paul, addressed the March meeting of the Minnesota Pathological Society on "Asymmetrical Chondrodysplasia with Report of a Case." Other papers given were "Dwarfism" by Dr. Wm. A. O'Brien, Minneapolis, and "Blastomycotic Meningitis with Report of a Case" by Dr. L. R. Gown, Minneapolis.

Professor A. E. Stewart, professor of agricultural physics at the University of Minnesota, will speak on "The Essentials of Fresh Air" with illustrations by lantern slides Tuesday evening, May 6, during Health Week at the Minneapolis Armory. Ventilation in the modern home will be one of the features of Professor Stewart's address.

In an effort to increase the circulation of Hygeia a letter was recently sent to the secretary of each county society in Minnesota urging them to take up the matter of a Hygeia publicity committee with their local society. A county society can further the proper kind of medical publicity in no better way than taking a group subscription to Hygeia and placing Hygeia on the reception room table in each member's office.

The Samuel D. Gross prize of $1,500 is offered this year for the best original essay illustrative of some subject in surgical, pathological or medical practice founded upon original investigations. The essay must be written by a single author in English and should be sent to the Trustees of the Samuel D. Gross Prize of the Philadelphia Academy of Surgeons, care of the College of Physicians, 19 South 22d Street, Philadelphia, on or before January 1, 1925. The competition is open to American citizens only.

The March number of MINNESOTA MEDICINE contained a short account of the Benjamin Franklin fund and the award to one Pierson W. Banning of Los Angeles of 2,500 pounds for his published work, "Mental and Spiritual Healing." Most of our readers are doubtless aware by now that the entire "story" was a hoax from start to finish, pulled off by the author, as he states, to win a bet. The whole story is rather interesting reading and is a good illustration of how publications credit the appearance of news items appearing in other publications. In this instance the *London Times*, *British Medical Journal*, *New York Times*, and *Literary Digest* were all taken in. That the purpose of the ruse was to sell a worthless book seems apparent. The author, like the passer of a bogus check, seems to have imposed upon the general faith in human integrity, which is at the basis of all commercial and professional activities. The excuse given that this performance was a joke does not excuse a professional man for such a performance, and we hope our friend, Banning, obtained all the notoriety he sought.

At the meeting of the Administrative Board of the Medical School, University of Minnesota, April 10, 1924, the following nominations for medical school appointments were made: A. G. Mulder for the Shevlin Fellowship, serving in Physiology; Frank J. Heck as Teaching Fellow in Pathology, subject to the approval of the Graduate Medical Committee; Dr. Thorald E. Davidson, first year Teaching Fellow in Surgery, subject to the approval of the Graduate Medical Committee; Dr. M. N. Moss as Assistant in Obstetrics and Gynecology; Dr. David M. Siperstein as Assistant in Pediatrics; Dr. Kenneth H. Sutherland as Assistant in Preventive Medicine and Public Health; Dr. Laurence H. Cady as Assistant in Preventive Medicine and Public Health; Dr. Hewitt B. Hannah as Assistant in Nervous and Mental Diseases; Dr. Aaron Friedell as Assistant in Pediatrics; Jean C. Hawley, Bertha E. Rich, Ada M. Olsen, Eva H. Burggren and Antoinette A. Proshek as Assistants in Nursing; Corah V. Lund and Marion M. Stewart as Instructors in Nursing; Dr. Harry DeWitt Lees as Instructor in Preventive Medicine and Public Health; Dr. Reuben A. Johnson as Instructor in Medicine; Dr. George N. Ruhberg as Instructor in Neurology; Dr. H. S. Lippman as Instructor in Pediatrics.

The following appeal (translated from the "Berliner Tageblatt" for January 8, 1924) has been issued by a committee composed of the following, and other well-known members of the medical profession: Professors Bier, Bumm, Czerny, His and Goldschneider:

"The appalling need, which all brain workers in Germany are experiencing, is being felt in an overwhelming measure by doctors. Large numbers of people are no longer calling in medical aid on account of their inability to pay the fees. This dwindling number of their patients has brought thousands of doctors to such a dire state of need that they have been obliged to seek other ways of earning a livelihood, and the majority of them are in a pitiable condition. Some have been driven to commit suicide. This need might be mitigated, if in the already-existing or planned community kitchens in Berlin, meals for doctors—'mensæ medicæ' could be established. For these meals they should pay a small sum of money, or in certain exceptionally unfortunate cases, they might be given free. Dr. Eugenie Schwarzwald has placed at our disposal the kitchens which were created and are conducted by the Austrian 'Friendly Help.' What is now wanted is money for carrying on the work in the kitchens and for buying the food. We appeal to everyone who has cause for gratitude to the medical profession to send contributions to the credit of the 'Friendly Help' (Dept. Mensæ Medicæ) to the Bank of Mendelssohn & Co., Berlin, W 8, Jagerstrasse 51; and by this means assist in maintaining the public health."

NEW AND NON-OFFICIAL REMEDIES

The following articles have been accepted by the Council on Pharmacy and Chemistry:

PARKE, DAVIS AND CO.:

Apothesine
Apothesine Solution
Apothesine Hypodermic Tablets 0.08 Gm. (1¼ Gr.)
Apothesine and Adrenalin Hypodermic Tablets
Apothesine and Adrenalin Hypodermic Tablets (R "B")
Apothesine and Adrenalin Hypodermic Tablets Cylindrical (for pressure anesthesia)
Apothesine Ointment
Pituitrin "S" (Surgical)

E. R. SQUIBB AND SONS:

Cod Liver Oil-Squibb

UNITED STATES STANDARD PRODUCTS CO.:

Acne Vaccine
Gonococcus Vaccine
Pertussis (Whooping Cough) Vaccine
Staphylococcus Combined Vaccine
Streptococcus Vaccine
Typhoid Vaccine
Typhoid Paratyphoid Vaccine Combined
Acne Vaccine Combined
Normal Horse Serum
Diphtheria Antitoxin, Refined and Concentrated
Diphtheria Toxin-Antitoxin Mixture (0.1 L +)
Diphtheria Toxin for Schick Test and Control
Tetanus Antitoxin

TRUTH ABOUT MEDICINES
NEW AND NON-OFFICIAL REMEDIES

Patch's Flavored Cod Liver Oil.—Cod liver oil containing 0.5 per cent of essential oils as flavoring, and having a vitamin potency so that 0.002 gm. per day is adequate to promote the growth of young albino rats. For discussion of the actions and uses of cod liver oil, see Useful Drugs. The dose is not more than 4 c.c. (1 fluidrachm) 3 times a day. For children not more than 2 c.c. (30 minims) 3 times a day. E. L. Patch Co., Boston.

Vitalait Culture Bacillus Acidophilus.—A pure culture of Bacillus acidophilus in vials each containing about 7 c.c. It contains not less than three hundred million of viable organisms (B. acidophilus) per cubic centimeter at the time of sale. For a discussion of the actions and uses of cultures of B. acidophilus, see Lactic Acid-Producing Organisms and Preparations, Jour. A. M. A., Sept. 8, 1923, p. 831. The usual dosage is the contents of one vial diluted with water and followed by a quantity of sugar of milk. The culture is distributed by the manufacturer only and is sent by mail. The Vitalait Laboratory of California, Pasadena, Calif. (Jour. A. M. A., March 1, p. 717.)

Apothesine. — Diethyl-amino-propyl cinnamate-hydrochloride. Apothesine is a local anesthetic of the procaine rather than the cocaine type, that is, it belongs to that type which, while effective for injection anesthesia (especially when combined with epinephrine), is relatively inefficient when applied to mucous membranes. It is rather slower in action than procaine. Its absolute toxicity is less than that of cocaine, but about twice that of procaine. It is employed for infiltration injection, nerve blocking, intraspinal injection, pressure anesthesia, oral administration as a palliative measure, for post-operative and persistent vomiting and pain of gastric ulcer. As a local anesthetic, apothesine is used in 0.5 to 2 per cent solution, generally with epinephrine and sterile water or physiological solution of sodium chloride. Apothesine is marketed in substance and also in the following forms: Apothesine solution 1.5 per cent; apothesine hypodermic tablets 0.08 gm.; apothesine and adrenalin hypodermic tablets (apothesine 0.04 gm.; adrenalin 0.00004 gm.); apothesine and adrenalin hypodermic tablets (apothesine 0.3 gm.; adrenalin 0.00003 gm.); apothesine and adrenalin hypodermic tablets cylindrical (apothesine 0.01 gm.; adrenalin 0.000025 gm.); apothesine ointment (apothesine 10 per cent; adrenalin 1:60,000, and menthol 0.5 per cent). Parke, Davis and Co., Detroit. (Jour. A. M. A., March 8, 1924, p. 793.)

Butesin Picrate. — Trinormalbutylparaminobenzoatedinitrophenal.—A compound consisting of one molecule of trinitrophenol (picric acid) and three molecules of normal butyl ester of 4-aminobenzoic acid. Butesin picrate combines the anesthetic action of butesin with the antiseptic properties of trinitrophenol (picric acid). An aqueous solution of 1:1,400 produces immediate and complete anesthesia of the eye, which lasts from ten to twenty minutes. Butesin picrate is used in the treatment of burns, ulcers and other denuded, painful lesions of the skin. For use, a 1 per cent butesin ointment is supplied by the manufacturer. The Abbott Laboratories, Chicago.

Normal Horse Serum.—A normal horse serum (see New and Non-official Remedies, 1923, p. 281) marketed in packages of one syringe containing 10 c.c.; also in packages of one syringe containing 20 c.c. United States Standard Products Co., Woodworth, Wis. (Jour. A. M. A., March 15, 1924, p. 876.)

Dibromin.—Dibromobarbituric acid.—Dibromin is an antiseptic and germicide proposed for use in solution as an irrigating fluid and wet dressings, for flushing cavities, irrigating infected wounds and for saturating gauze packings. Dibromin is claimed to be practically free from irritating or toxic properties in the concentrations required for therapeutic use. Solutions of 1:10,000 (6 grains to one gallon) or stronger are used. Dibromin is marketed in six grain capsules. Parke, Davis and Co., Detroit.

Acne Vaccine.—An acne vaccine (see New and Non-official Remedies, 1923, p. 302) marketed in packages of one 10 c.c. vial, each c.c. containing 40 million killed bacteria. United States Standard Products Co., Woodworth, Wis.

Gonococcus Vaccine.—A gonococcus vaccine (see New and Non-official Remedies, 1923, p. 304) marketed in packages of one 10 c.c. vial, each c.c. containing 1,000 million killed gonococci. United States Standard Products Co., Woodworth, Wis.

Pertussis (Whooping Cough) Vaccine.—A pertussis bacillus vaccine (see New and Non-official Remedies, 1923, p. 306) marketed in packages of one 10 c.c. vial, each c.c. containing 3,000 million killed pertussis bacilli. United States Standard Products Co., Woodworth, Wis.

Typhoid Vaccine.—A typhoid vaccine (see New and Non-official Remedies, 1923, p. 314) marketed in packages of three 1 c.c. vials, containing 500 million, 1,000 million and 1,000 million killed typhoid bacteria, respectively. United States Standard Products Co., Woodworth, Wis.

Typhoid Paratyphoid Vaccine (Combined).—A typhoid vaccine (see New and Non-official Remedies, 1923, p. 314) marketed in packages of three 1 c.c. vials, the first dose containing 500 million killed typhoid bacteria, 375 million killed paratyphoid A and 375 million killed paratyphoid B bacteria, the second and third doses each containing 1,000 million killed typhoid bacteria, 750 million killed paratyphoid A bacteria and 750 million killed paratyphoid B bacteria. United States Standard Products Co., Woodworth, Wis. (Jour. A. M. A., March 22, 1924, p. 967.)

Staphylococcus Combined Vaccine. — A staphylococcus vaccine (see New and Non-official Remedies, 1923, p. 310) marketed in packages of one 10 c.c. vial, each c.c. containing 1,000 million killed staphylococcus albus and 1,000 million killed staphylococcus aureus. United States Standard Products Co., Woodworth, Wis.

Streptococcus Vaccine. — A streptococcus vaccine (see New and Non-official Remedies, 1923, p. 312) marketed in packages of one 10 c.c. vial, each c.c. containing 400 million killed streptococci. United States Standard Products Co., Woodworth, Wis.

Acne Vaccine Combined.—A mixed bacterial vaccine (see New and Non-official Remedies, 1923, p. 318) marketed in packages containing one 10 c.c. vial, each c.c. containing 40 million killed acne bacilli and 1,000 million killed staphylococcus albus. United States Standard Products Co., Woodworth, Wis.

Diphtheria Antitoxin, Refined and Concentrated.—A refined and concentrated diphtheria antitoxin (see New and Non-official Remedies, 1923, p. 283) prepared according to to a modification of Banzhaf's method, marketed in syringes containing 1,000, 3,000, 5,000, 10,000 and 20,000 units, respectively. United States Standard Products Co., Woodworth, Wis.

Diphtheria Toxin-Antitoxin Mixture, 0.1 L +.—A diphtheria toxin-antitoxin mixture (see New and Non-official Remedies, 1923, p. 284) each c.c. constituting a single dose and marketed in packages of 3 vials, each containing 1 c.c.; in packages of 30 vials, each containing 1 c.c.; and in packages of one vial containing 30 c.c. United States Standard Products Co., Woodworth, Wis.

Diphtheria Toxin for Shick Test and Control.—A diphtheria immunity test (see New and Non-official Remedies, 1923, p. 323) marketed in packages containing a vial with undiluted diphtheria toxin and physiological solution of sodium chloride for dilution. As a means of control there is also supplied diphtheria toxin which has been heated to destroy the exotoxins. The product is marketed in packages containing an amount sufficient for fifty tests; also in packages containing an amount sufficient for one hundred tests, but the strength of the toxin is such that the dose is 0.1 c.c. United States Standard Products Co., Woodworth, Wis.

Tetanus Antitoxin.—A concentrated tetanus antitoxin (see New and Non-official Remedies, 1923, p. 284) prepared according to the Banzhaf method. Marketed in syringes containing 1,500, 5,000 and 10,000 units. United States Standard Products Co., Woodworth, Wis. (Jour. A. M. A., March 29, 1924, p. 1047.)

PROPAGANDA FOR REFORM

Citrophan.—This is a "fat cure" exploited to the medical profession and the public by the Gotham Corporation, New York City. The only statement bearing on the identity of Citrophan which is made is the claim that it is "a new organic iodin compound." The claims made for Citrophan are many and various; back of all of them is the fundamental thesis: "Science has found that the chief cause of obesity lies in the development of alcohol in the digestive tract brought about by the action of yeast bacteria—taken into the stomach in improperly baked bread—and on raw fruits and vegetables." This claim is unsupported by scientific work. The A. M. A. Chemical Laboratory reports that Citrophan is sold in the form of tablets ranging in weight from about 4½ grains to more than 7 grains. Analysis indicated that the chief medicinal ingredient was tetraiodophenolphthalein. Sugar of milk, starch, vegetable tissue and traces of an acid-insoluble substance (probably talc) were found; also two per cent of an unidentified organic substance. Quantitative determinations showed the composition of Citrophan to be: tetraiodophenolphthalein 40 per cent, sugar of milk 52 per cent, ash (including talc) 3 per cent, starch and undetermined 5 per cent. About twenty-five years ago, tetraiodophenolphthalein, the chief medicinal ingredient of Citrophan, was exploited under the name "nosophen" as an external and internal antiseptic. It has never attracted much attention in this country. Fangarine is sold (in the form of tablets) along with Citrophan. This the A. M. A. Chemical Laboratory found to contain phenolphthalein as its medicinal ingredient. It is evident that Citrophan is not a new discovery as claimed, and there is no evidence that Citrophan will reduce weight, except perhaps by disturbing the digestive functions. (Jour. A. M. A., March 1, 1924, p. 734.)

Mistura Creosote Comp. (Killgore's) and Tablets Cascara Comp. (Killgore's).—The Council on Pharmacy and Chemistry reports that these products were found unacceptable for New and Non-official Remedies. Mistura Creosote Comp. (Killgore's) is marketed with the claim that each teaspoonful contains two minims of creosote "combined with Tonic Aromatics," but the identity and amount of the "Tonic Aromatics" is not declared. The Council declared the preparation in conflict with the rules that govern the acceptance of articles in that it is a mixture of semisecret composition which is marketed with unwarranted therapeutic claims and in a way that may lead the public to depend on it for the self-treatment of serious diseases. Tablets Cascara Comp. (Killgore's) are said to have the

following composition: "Ext. Cascara 2 grs.; Podophyllin ⅛ gr.; Ext. Belladonna $\frac{1}{75}$ gr." The tablets were found in conflict with the rules that govern the acceptance of articles. The product is marketed under a name which is not descriptive of its composition in that the name indicates that it is a cascara preparation, yet the most active constituent is resin of podophyllum; the product is marketed with unwarranted therapeutic claims and the composition of the tablets is unscientific because there is no evidence that a therapeutic dose of extract of belladonna is useful with a suitable dose of resin of podophyllum or of extract of cascara sagrada. (Jour. A. M. A., March 8, 1924, p. 812.)

Sodium Morrhuate in Tuberculosis.—Sodium morrhuate is the sodium compound (soap) of the fatty acids obtained from cod liver oil. Its use in tuberculosis has been advocated, but like other preparations proposed for the treatment of this disease, it has not been shown to have value. The reported trials make its lack of value probable. Sodium morrhuate has not been admitted to New and Non-official Remedies. (Jour. A. M. A., 1924, p. 813.)

The Rectal Administration of Arsphenamin.—The intravenous administration of arsphenamin requires some skill, especially in children and in the obese in whom the veins are not readily accessible. Attempts have been made, therefore, to develop other methods of securing the effects of the drug. Among these, rectal administration has found most advocates. Manufacturers, ever seeking novelties, have used favorable reports to market suppositories of arsphenamin. In 1920, the Council on Pharmacy and Chemistry published a report on supsalves stating that the evidence for the rectal administration of arsphenamin was distinctly unfavorable. At present the medical profession is being circularized by the Swan-Myer Company in an endeavor to popularize the rectal administration of arsphenamin in the form of suppositories sold as arsphenoids. It is opportune, therefore, that Littman and Hutton, at the request of the Therapeutic Research Committee of the Council on Pharmacy and Chemistry, present a critical review of the literature and the result of clinical trials of the rectal use of arsphenamin. Since most advocates of the rectal administration of arsphenamin stress its importance in the case of infants, the investigators carried out their study with children with active symptoms of congenital syphilis. They used arsphenamin given by enterocylsis and also the supsalves suppositories. The authors conclude that the clinical results were too feeble as compared with the intravenous or intramuscular method to warrant favorable consideration of the rectal administration. The investigators hold, moreover, that neoarsphenamin and sulpharsphenamin are now generally used by the intramuscular route in the treatment of syphilis in infants with results that are above reproach. (Jour. A. M. A., March 15, 1924, p. 888.)

"Vita-Pep."—Vita-Pep is nominally put on the market by the Vitamine Products Co., of New York City, but actually seems to be put out by the Vitamin Food Co., Inc., of Westfield, Mass. The president of the Vitamin Food Co. is one Eugene Christian, who calls himself a food specialist. He has offered a "Course in Scientific Eating" in which he showed his monumental ignorance of the subject he wanted to teach. Later, he was interested in an obesity treatment, the "Vaco Reducing Cup." Then he tried to sell oil stock to those on the sucker list. Then came the Vitamin Food Co., Inc., with Christian as president, and those on the sucker list were asked to buy stock in this company. In the earlier advertising, the product mainly stressed was "Vegex," which, according to the advertising matter, was a name that the Vitamin Food Co., Inc., had given to a British preparation sold across the water as "Marmite." Now comes the crowning achievement of the Vitamin Food Co., Inc., Vita-Pep. The circular for this contained the statement in large letters that the preparation contains alcohol 16 per cent. According to the label, Vita-Pep, in addition to containing wine with an alcohol strength of 16 per cent, also contains pepsin, rennin and a concentrate of vitamin "B." The advertising circular states that Vita-Pep is a "Zestful New Health Tonic" which "Restores Youthful Vitality." According to the advertising, "Vita-Pep is pleasant to the taste and delightful in its effect—takes away that tired, rundown feeling and makes one feel vigorous, healthy and strong." What is the United States Revenue Department going to do about it? (Jour. A. M. A., March 15, 1924, p. 907.)

Fat-Free Tincture of Digitalis.—Roth found that fat-free tinctures of digitalis had no advantages over the U. S. P. tincture of digitalis. On the contrary, he found some of these fat-free tinctures were so unstable that he advised manufacturers not to market them without stating the date of their manufacture on the label. "Fat-free" tincture of digitalis was introduced under the belief that the fat from the leaf produced gastric disturbance; but Hatcher and Eggleston fed the fat to cats and found that it had no emetic action whatever. After an investigation of the subject, the Council on Pharmacy and Chemistry concluded that there is no essential difference in action between "fat-free" tinctures of digitalis and the product official in the U. S. Pharmacopeia. (Jour. A. M. A., March 16, 1924, p. 911.)

Digifolin.—The claim is made for Digifolin that it keeps indefinitely. The available scientific evidence indicates that all digitalis preparations deteriorate with age. (Jour. A. M. A., March 15, 1924, p. 911.)

Canine Rabies Virus.—Results of the single injection method against rabies in dogs have been reported from different sources. The U. S. Bureau of Animal Industry has been conducting experimental work on this subject and results indicate that the prophylactic vaccination has value which, however, is determined to a certain extent by the virus to which the animal is exposed. The use of the single injection vaccine in animals that have been bitten is believed to be unwarranted at this time. The Högyes treatment of six doses, in animals bitten, has been used successfully for some time and the failures reported have been small. The use of the Högyes vaccine together with the cauterization of the wound and the placing of the animal in quarantine for six months to a year seems to be the best method of treating such cases. (Jour. A. M. A., March 29, 1924, p. 1066.)

Allonal-Roche.—Allonal (The Hoffmann-La Roche Chemical Works, New York) is "Allylisopropylbarbituric acid-Phenyl-dimethyl dimethylamino pyrazolon." In the literture first sent out, it was stated to be a "compound" made by "chemically uniting allyl-isopropylbarbituric acid (37.5%) with phenyl di-methyl-dimethylamino-pyrazolon (52.5%) amidopyrin, i. e., in molecular proportions 1:2." Examination of Allonal tablets made in the A. M. A. Chemical Laboratory last year showed that, in water, the substance behaved as a mixture of allyl-isopropyl barbituric acid and amidopyrin and not as a compound. Furthermore, the percentages of the ingredients given were not in accord with the statement that they were in molecular proportions. The published reports on its use are favorable, but they apparently include no observations with controls. The evidence thus far available does not seem to prove (1) that "Allonal" possesses advantage over a mixture of allyl-isopropyl barbituric acid and amidopyrin, or even over one or other of its ingredients alone; (2) that the administration of allyl-isopropyl barbituric acid and amidopyrin in fixed proportion is desirable. The product has not been accepted for New and Non-official Remedies. (Jour. A. M. A., March 29, p. 1066.)

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of March 12, 1924

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, March 12, 1924, at 8 p. m. The meeting was called to order by the President, Dr. Hamilton. There were 34 members and three visitors present.

The minutes of the February meeting were read and approved.

Dr. S. E. Sweitzer was elected to membership in the Academy.

The following members reported cases:

1. Dr. E. M. Hammes (St. Paul) reported three cases.

Case 1. Male, 19 years old, single, seen in consultation with Dr. Knox Bacon, Nov. 1, 1923. Family and personal history were negative. Present complaint began about October 10, 1923, with frontal headache. A few days later patient became nauseated with occasional expulsive vomiting. About Nov. 1st the family noticed that he had some difficulty in finding correct words while carrying on a conversation. At the same time he complained of vertigo on standing and of some impaired vision. In the course of a conversation he would stop abruptly in the middle of a sentence and forget to finish it. After being kept in bed for a week he seemed brighter and his headache was not as intense. He had an occasional degree of temperature. Pulse 80. Neurological examination at this time was negative except that he had bilateral choked discs, a slightly positive Romberg, and some mental confusion. His reflexes were normal. All laboratory findings, including spinal fluid examination, were negative except for a leucocytosis of 12,000. I saw him again in consultation with Dr. Hoffman, November 15th. His condition was about the same but it was found that his choked discs were more pronounced; that he had right homonymous hemianopsia; some ataxia of the left arm; increased right knee-jerk; absent left abdominal reflex; slight tenderness in occipital region. *X*-ray of skull was negative. A diagnosis of left occipital lobe tumor was made. He went to Philadelphia and rapidly grew worse. Dr. Frazier suspected a possible occipital abscess and introduced a trocar into the occipital lobe, with negative findings. A bone-flap operation over the left occipital area revealed no definite pathology but Dr. Frazier thought that he probably had an infiltrating glioma of the left occipital lobe. He died three days later. No post-mortem was permitted.

Case 2. Female, aged 21, single, seen in consultation with Dr. A. Conley, of Cannon Falls, Minnesota, June 24, 1923.

Family and personal history negative. Patient states that during April, 1923, she developed headaches of short duration which gradually became more frequent and more severe. About one month later she had an occasional dizzy spell, especially when she became fatigued, and during the latter part of May she had three attacks of emesis in the early morning. About this time her headaches were relieved somewhat by getting glasses, but became more pronounced a week later. On June 19th her pulse was 75; on June 21st it was 50; on June 23rd it was 40 per minute, and on arrival at the hospital on June 24th her pulse was 36. She stood the trip (forty miles by auto) well.

Her neurological examination was negative except for slight rigidity of the neck muscles, which was probably voluntary, because of excruciating headache; an irregular nystagmoid movement of the eyeballs to the right; sluggish right superficial reflexes; a positive Kernig and absent knee-jerks, and a beginning optic neuritis. A lumbar puncture was performed and about 35 c.c. of clear spinal fluid under pressure were removed. This gave some relief of her headache and her pulse went up to 48. The spinal fluid showed the following: Fibrin web on standing; 24 lymphocytes per cu. mm., a positive globulin, a negative Wassermann, and negative colloidal gold curve. No tubercle bacilli or other bacteria were found. A tentative diagnosis of tubercular meningitis or epidemic encephalitis was made. Her temperature was normal; her pulse varied between 36 and 70. With daily lumbar punctures, her headaches were relieved and she improved somewhat. However, on July 1st, she suddenly developed respiratory paralysis and died.

Post-mortem examination of the brain by Dr. J. C. McKinley revealed an internal hydrocephalus, and a tumor mass about 3.5 cm. in diameter entirely occluding the 4th ventricle. The tumor proved to be a sarcoma, probably arising from the choroid plexus. There were a few meningeal metastases but no pathology was found in the other organs.

Case 3. Female, aged 58, married. Seen in consultation with Dr. C. Bell, of St. Paul, October 30, 1923.

Her family history was negative; her past history was negative except that she had a carcinoma of the left breast removed in 1921 by Dr. Judd, of Rochester. About eight

months ago, she developed some pains in her back and in both legs, especially left ankle, which were thought to be rheumatic. About six months ago she noticed a small lump over the parietal region of her skull—painless and not tender. This grew quite rapidly but caused no inconvenience except that it was an annoyance when she combed her hair. By October it was about the size and shape of half of a hen's egg. October 30th she suddenly developed a generalized convulsion and when I saw her, half an hour later, she was quite confused but able to answer questions.

Neurological examination was negative throughout. During the night she had two more convulsions and the next day her right hand was weak and awkward. Her condition has slowly progressed during the past month. She furthermore has definite tenderness over the 4th and 5th lumbar vertebræ. An *x*-ray of the skull revealed multiple areas of bone destruction, probably carcinomatous metastasis. *X* ray of left angle was negative.

2. Dr. H. P. Ritchie reported a case of Vesico-Diverticulo-Rectal Fistula.

Mr. C. E. B., aged 63, consulted Dr. A. MacLaren on February 12, 1923.

History: Fifteen years ago began to have frequency of urination; up three or four times at night for several years. Five years ago supposed to have had a prostatic abscess which discharged through rectum, followed by a urinary fistula. During this time several examinations were made and carcinoma of the prostate diagnosed by two reliable men. The fistula closed after three months He has been able to do his work until a few months ago, when fistula returned.

Present complaint: Evacuation of urine every two hours per rectum. Small quantity of urine per urethram after great exertion. Patient losing weight with general physical lassitude.

Cystoscopy, made by Dr. Paul Cook, showed a suppurative cystitis. At right base of bladder was a large diverticulum, so placed as to be in line with the ureter. The right ureter could not be found. The left was catheterized to find pus urine but a competent kidney. There was little, if any, enlargement of the prostate.

Operation: The general conditions were most unfavorable for operative procedures, but the distressing state of the patient led him to assume all risks so Dr. MacLaren asked me to make the attempt at closure. From Dr. Cook's report it seemed necessary to locate the right ureter, so I cystoscoped him before attacking him from above, but was unable to find the meatus, nor at any time during the operation was the ureter seen. The extraordinary cystitis led me to attempt an extra-vesicle demonstration of the diverticulum, but such was the thickness and friability of the wall that the peritoneum was opened in two places before I desisted from this plan. The bladder was then opened, and the side wall bisected to and into the diverticulum. The fear was of making a large opening into the rectum, as it was natural to suppose that it was closely adherent to the pouch, but to the surprise and relief of Dr. Daugherty and myself a line of cleavage was readily shown so that the diverticulum was peeled off, like a skin from an orange, down to a point where we could see, by means of a headlight and constant use of the aspirator, the fistulous track about one-fourth inch in diameter. This was clamped by forceps and tied, the sac removed, the wall of the bladder repaired, and drainage extra- and intra-vesicular instituted. As before stated, the meatus or ureter was never seen and from the location of the pouch and the extent of the dissection, it must have been involved. But so far as we could see there were no signs of kidney obstruction at any time.

The convalescence was stormy, caused by the most extreme sepsis of the wound, resulting from the great infection of the bladder, macroscopically due to the colon bacillus. The mercurochrome, now so widely advertised, seemed to give the best results in irrigating him.

After six weeks of trying time he recovered and within the past few months reports the fistula has remained closed but that frequency still is present. Occasionally there is some leak from the suprapubic wound. But the general condition is so improved as to be satisfactory to all concerned.

It would be hard to conceive of this situation occurring in a woman. It must be a most rare situation, but the possibility of its occurrence may make it worth recording.

3. Dr. G. Schwyzer (Minneapolis) reported a case of Adeno-Carcinoma of an Accessory Thyroid.

A fifty-four-year-old woman consulted us in the first week of January, 1924, for a tumor on the right side of her neck below the jaw.

There is an extensive scar in the region of the clavicles and upper end of sternum indicating a collar incision. We learn from the patient that she had a goiter operation three years previously. Following that operation she was hoarse, though her voice improved gradually but never completely. Six months following this goiter operation the present tumor made its first appearance in the size of a walnut, and it has gradually grown to the present size, that of a fist. The main distress through the tumor lies in the difficulty in swallowing food. The latter goes, as she says, to a certain point in her throat and only by a special effort is the food pressed farther down.

The rather well-nourished woman has not lost any weight, weighs at present 153 pounds, feels fairly strong and is able to do heavy work like washing and so on.

The tumor on the side of her neck is about four inches long and two inches in diameter vertically. The covering skin is normal, the consistency is generally soft elastic, partly fluctuating. It can be moved in a vertical sense, but not horizontally.

Laryngoscopically we find, and this has been confirmed by the laryngologist, an unusual picture. A tumor of the size of a plum bulges out into the pharynx below the tonsil and obstructs greatly the laryngoscopical picture. Only the left vocal cord is visible, and this appears paretic. Palpating this tumorous projection in the pharynx we are convinced that we have to do with the same growth that exists on the outside. We even state a feeling of fluctuation between inner and outer part of the tumor. The mucous lining covering the pharynx is normal. There are no pains by palpation.

Our diagnosis was a branchial tumor, partially cystic.

We operated January 10th under local anesthesia. We used 100 c.c. of 0.5 per cent novocaine solution. Anesthesia was done after Braun—prevertebral injection and blocking of the nerves around the tumor. Generally speaking the anesthesia was efficient. The operation was exceedingly difficult and involved unusual anatomical dissection. The nervus hypoglossus with its descending branches and the common carotid had to be dissected free from the tumor. The latter ran over the posterior part of the tumor but anteriorly. Inferiorly scar tissue made blunt dissection impossible. Posteriorly to the tumor lies the vertebral column, and between the two our hand tries to reach toward the pharynx. We are succeeding in peeling out the tumor away from the mucous lining of the pharynx, though the pharyngeal mucous lining tears in one place in a distance of about a half an inch. This rent is immediately sutured with chromic catgut. The wound is then closed and well drained.

Four hours after the operation the patient presents the picture of novocaine poisoning. She is stuporous, cyanosed in the face, has blue finger nails and an irregular pulse of only 70, breathing normal. We give 700 c.c. saline solution intravenously together with calcium chloride given by rectum in repeated doses so that she had about 8 grams that night. Sensorium becomes clear the next morning. She appears rather nervous. Continuous proctocleisis is given in order to avoid deglutition.

On the third day patient takes nourishments. On the fourth day foul breath is noticed. Patient becomes unmanageable, talks irrationally, gives the picture of persecution insanity, has to be isolated and restrained. The wound of neck discharges some infected secretion. Thorough disinfection—Di-chloramin-T used. We are probing the wound to see whether we have any communication between outer wound and pharynx. We are unable to feel the probe on the inside.

On the fifth day patient is comatose with a strong regular pulse of 120. She cannot be aroused any more and succumbed the morning of the sixth day following the operation.

The pathologist, Dr. E. T. Bell, reports that sections from tissue of the tumor show adeno-carcinoma of an accessory thyroid.

The case presents interesting features not only diagnostically and pathologically, but also post-operatively, on account of symptoms following local anesthesia. As I mentioned before, we used 100 c.c. of 0.5 per cent novocaine solution. In German literature I read of calcium chloride being given as an antidote for novocaine poisoning. It was rather astonishing to find the patient with a clear sensorium the next morning.

The question arose as to what this woman died from. The nearest reason we could think of was from infection due to the rent in the pharynx. In our estimation that rent opened up the day we noticed the foul breath. In regard to the psychical changes a thought of explanation came to us through the pathological report which told us that we had to do with an accessory thyroid. The other pathologist who examined the specimen thought he found tissue indicating hyperthyroidism. Clinically, however, the patient did not present any such symptoms previous to operation.

DISCUSSION

DR. FARR: I have had no experience with novocain poisoning because I have never seen anything more than slight manifestations of its toxicity. I would like to ask Dr. Schwyzer upon what he bases his diagnosis of novocain poisoning. When novocain comes in contact with the nerve cells and acts upon them the resulting substance formed is passive and innocuous. Toxic symptoms arise from the contact of novocain with the central nervous system. Considering my own experience, and just having completed the reading of Dr. Braun's book in which he goes into the question of toxicity extensively, I cannot believe that the symptoms given by Dr. Schwyzer are an evidence of novocain poisoning.

Poisoning as late as this does not occur, as far as I know. When the toxic dose is given symptoms appear immediately. I would, therefore, question symptoms coming on four hours after operation being due to novocain.

I have, in a few instances, accidentally injected a small amount of novocain solution directly into an artery or vein under circumstances which permitted the solution to be carried to the central nervous system. The symptoms were always acute and immediate. The patient develops a bursting headache, becomes pale, the pupils dilate, nausea and vomiting appear, and in case a lethal dose is given convulsions appear.

I have had a case of cocain death. The patient developed convulsions and a paralysis of respiration. The heart continued to beat for one hour and five minutes under artificial respiration. In this case we supposed we were using novocain. It would take more evidence than Dr. Schwyzer has given to convince me that the case he reported was one of novocain poisoning, and I believe we should be extremely careful in checking up such cases so that the actual toxicity of novocain may become known.

DR. G. SCHWYZER: In answer to Dr. Farr's remarks, I would like to say that the poisoning certainly followed the operation immediately, though I did not observe the patient for two to three hours directly after the operation. Still I positively know that four hours after the operation the patient was completely stuporous, could only be aroused by our shaking her and she was cyanosed at that time, her finger nails were black, and her former strong pulse weakened, decreased to only 70 and became very irregular. Of what other condition than of the poisoning through the local anesthetic could we think, when on the following morning we found the patient entirely clear, having a good expression, a free sensorium, and a strong pulse of 100?

4. DR. GEO. DOUGLAS HEAD reported a Case of Primary Tuberculosis of the Spleen with Polycythemia and Splenomegaly, Treated with Radium and Benzol.

The following case is reported to the Society because of its scientific importance and the long interval of time—nearly six and a half years—during which the patient was observed under treatment with radium and benzol.

SUMMARY OF CASE REPORT

Mrs. Van., American, age forty-nine. Married, four children, two living. First examination January 26, 1917.

Mother died of cancer of the stomach. One sister died of cancer of the uterus. Patient was said to have had "water diabetes" at three years of age. Had typhoid fever at eighteen years of age. Operated upon for appendicitis six years ago. For five or six years patient has occasionally taken antikamnia for headaches. Had menopause at forty-three years.

Patient's present illness dated back three years from the time of the primary examination. She complained of a feeling of tightness in the epigastrium, with excessive salivation and occasional vomiting spells. At first the attacks came only about once a month but increased in frequency and she has had as many as three a day, especially when under nervous strain. At that time patient also had dizzy spells and tired easily. Was bothered with morning headaches and attacks of epistaxis. Had lost in weight eighteen pounds. Never vomited blood. Redness of her face became noticeable two years before the primary examination. This was more marked under exertion.

Patient was a short, slim woman with light hair and eyes. One was struck at once by the deep red color of patient's skin and mucous membranes. The face, forehead and neck showed a high, dark red, while the fingers were red with a bluish tinge. The lips and alæ of the nose were a bluish tinge. The tongue was red with dilated veins on its under surface. The back of the throat was congested and covered with dilated venules. The inside of the lips and cheeks showed a dark red congested appearance. The eyes looked inflamed. The lids were red with prominent blood vessels over the sclera.

Careful physical examination was negative for organic disease outside of the enlarged spleen, the polycythemia, and the hypertension. The spleen could be felt two fingers' breadth below the costal margin. The surface was smooth, its edge hard and firm. The blood examinaiton was as follows: Hemoglobin 140 per cent, R. B. C. 8,760,000, W. B. C. 13,500. Differential count: P. M. N. 77.0, Large monos. 4.0, Lympho. 12.5, Trans. 3.0, Eosin. 3.0, Basophiles 0.5, Myelocytes 0.0. The R. B. C. appeared normal in the stained smear. The blood pressure was 208 systolic and 110 diastolic. The von Pirquet tuberculin test was strongly positive. A test for the fragility of the red blood cells was normal. Phenolsulphonephthalein test was normal. Occult blood test for stools was negative. She gave a strong positive reaction to the subcutaneous tuberculin test.

All other findings being negative, a diagnosis of tuberculosis of the spleen, with polycythemia and hypertension, was made. The splenic area was exposed to 90 mgms. of radium on two successive days and patient was placed on benzol, five grains three times a day. Blood examination made seven weeks following the radium exposure was as follows: hemoglobin 110 per cent, R. B. C. 8,650,000, W. B. C. 7,300. Differential count: P. M. N. 81.0, Large monos. 1.0, Lympho. 16.5, Trans. 0.0, Eosino. 1.5, Baso. 0.0, Myelo. 0.0. Patient's color was much improved. Blood pressure was 130 systolic, 90 diastolic. Spleen was not palpable and was diminished in size to percussion. She had gained in weight but had had a hemorrhage from the bowels of one cup of blood five weeks prior to this examination.

Six months later patient was again examined. The blood examination showed marked improvement—hemoglobin 105 per cent, R. B. C. 6,230,000, W. B. C. 12,800. Differential count: P. M. N. 75.5, Large monos. 3.0, Lympho. 15.0, Trans. 2.5, Eosino. 0.0, Baso. 0.0, Myelo. 0.0. The blood pressure was 148 systolic, 88 diastolic.

In November, 1919, about three years after coming under observation, patient was again examined. Her color was nearly normal. The spleen was not palpable at the costal margin. She had taken benzol from time to time. The blood examination showed the hemoglobin 110 per cent, R. B. C. 6,975,000, W. B. C. 10,750. Blood pressure was 136 systolic, 82 diastolic.

In April, 1920, patient returned again for bleeding of the gums when she cleaned her teeth. Blood examination showed more polycythemia — hemoglobin 125 per cent, R. B. C. 7,360,000. A second series of radium exposures of the spleen was made and patient was advised to again take benzol. Six months after the second radium treatment, the blood showed marked improvement and was as follows: Hemoglobin 100 per cent, R. B. C. 5,680,000, W. B. C. 17,000. Differential count: P. M. N. 79.0, Lympho. 11.0, Large monos. 5.0, Trans. 2.0, Eosino. 1.0, Baso. 2.0.

In May, 1921, patient was again examined, as she was feeling much worse. The color of her face was a dark, suffused red, the conjunctivæ very much injected and red. Her hands were a dark, bluish red color. The spleen, however, could not be palpated below the costal margin. Blood pressure was 175 systolic, 90 diastolic. The blood examination showed the hemoglobin 125 per cent, R. B. C. 7,760,000, W. B. C. 14,000. Patient was again placed upon benzol but made no improvement in the blood; in July, 1922, the blood examination being worse—hemoglobin 133 per cent, R. B. C. 9,190,000, W. B. C. 18,300.

Radium over the spleen was again used, 100 mgms. for eight hours being given. Patient improved symptomatically but no blood examination was made prior to September, 1923, when she returned again in another exacerbation, with a hemoglobin of 150 per cent, red cells 8,112,000, leucocytes 18,250. Radium 100 mgms. over an eight hour period was again used over the splenic area. No examinations of the blood have been made following the last radium treatment.

DISCUSSION

DR. ULRICH: I listened with great interest and some astonishment to the reading of this case, that is, a case of polycythemia associated with tuberculosis of the spleen. It has always been our assumption that tuberculosis of the spleen produces a profound anemia. Cirrhosis of the liver occasionally is associated with polycythemia but I have never heard of polycythemia associated with primary tuberculosis of the spleen. Primary tuberculosis of the spleen is exceedingly rare and the diagnosis can only be made with accuracy at the post-mortem or on biopsy. I do not think in this report that one can make a diagnosis of tuberculosis of the spleen by a von Pirquet reaction and subcutaneous tuberculin reaction. The cure of primary tuberculosis of the spleen is splenectomy.

DR. CROSS: I would like to ask Dr. Head whether the same clinical improvement followed the last use of radium, as it did in the other applications of it.

DR. MANN: I do not know very much about radium, but I would like to ask a question. As I understand it, the distance through which radium is effective is about 2 cm., when the hard rays are screened off, so in this case it could not shine into the spleen very far even if it could reach the spleen. Of course this patient was a slender woman. In that case, I would like to ask Dr. Head why he could not get a much better effect from *x*-ray, especially deep *x*-ray which would shine all the way through, if he did not want the spleen taken out.

DR. A. SCHWYZER: The hardest gamma rays are more penetrating than the hottest *x*-ray. It will penertate 26½ cm. very well and go even through the body in a very large spleen. Radium will surely work. The filtering must be pretty strong. I remember a case I had in which we filtered through 1 mm. of brass, 0.5 mm. of silver, and in addition 2 mm. of lead. Of course lead gives strong beta rays and you have to use rubber over it. This spleen went down to one-third before we operated.

DR. HEAD (in closing): I can only say in answer to Dr. Mann's suggestion with relation to the penetration of radium, that the spleen diminished in size after the use of radium and the clinical evidence was very clear that the use of the radium had considerable to do with it. One of the interesting features about this case is that we did not apply it once but repeated the radium on three successive occasions, and to me that is fairly good evidence that it was the radium which produced the favorable outcome.

In answer to Dr. Cross' question, the last exposure has been too recent to determine whether or not it will be of any real benefit. In the next to the last exposure I do not think we got as profound an effect. At the present time the patient's blood is as polycythemic as at any time.

I was in hopes that in the discussion the natural exacerbations of the disease might be brought out. That is, do the cases, like pernicious anemia, run courses with exacerbations and remissions when left to themselves? In the literature one finds very few reports of cases of polycythemia that have been followed over any long period of years to determine just the course which they pursue, uninfluenced by drugs or other management. Osler had cases reported over a number of years.

In answer to Dr. Ulrich's expressed doubt relative to the etiological relationship between tuberculosis and polycythemia: If I remember correctly, one of the first cases on record was proven at autopsy to be tuberculosis of the spleen. In Weber's monograph on polycythemia, the detailed report of the authentic cases which he presents reveals tuberculosis as a prominent pathological factor in the history of the cases and the autopsy findings. Tuberculosis of the spleen has been established by numerous case reports as associated with polycythemia and splenomegaly. I think if Dr. Ulrich will read Weber's and Winternitz's studies, he will change his notions regarding the independence of tuberculosis of the spleen and polycythemia.

Of course I do not want to contend that the subcutaneous tuberculin test, or a positive von Pirquet test is proof of tuberculosis of the spleen. I think, however, that with the clinical absence of tuberculosis or other disease in other organs and the presence of the positive tuberculin tests, there was justified the assumption that we have a true case of primary tuberculosis of the spleen with polycythemia in this case. At least I would stand for that diagnosis until some other could be proved.

This case is of a good deal of interest scientifically for the reason that we have been able to watch a real case of polycythemia vera, probably proven to be of tuberculous origin, over six years of time, through three distinct exacerbations, and been able to watch the profound effect, on the blood and the size of the spleen, which radium produced with the use of benzol. My own clinical opinion is that we have received more benefit from the radium than the benzol. I have now under observation a man forty years of age, with polycythemia and enlarged spleen, who about two months ago vomited a bowlful of blood. This patient gives a four plus Wassermann and the diagnosis of syphilis of the spleen seems justified. In these two cases we have, therefore, polcythemia with splenomegaly caused by two of the great contenders for pathological honors, the tubercle bacillus and the spirochete of syphilis.

5. DR. J. G. CROSS reported the following case: This case is reported because of the great difficulty in making a diagnosis. The patient was a man of 64, weighing in health 190 pounds, a lawyer by profession. With the exception of a so-called "nervous breakdown" many years ago and a suspicion of tuberculosis as a young man, his history to July, 1923, is practically that of a healthy man. At that time he showed retention of urine and a prostatic enlargement was made out and operation advised by his physicians, Dr. Staples and Dr. Butler. Prostatectomy was done at Rochester in two stages and he returned home to Minneapolis in early November, 1923. Except for the presence of some albumin and pus in the urine as is common in such cases, his recovery seemed to be very good, and he resumed the practice of his profession.

The first week in January he attended the annual stag dinner given by one of his friends, at which such delicacies as pork sausages, sauerkraut, and buckwheat cakes were partaken of. He had some immediate distress—nausea and vomiting. He was seen about three days later because the vomiting did not cease. His temperature was 99.2 and as a matter of fact, never was raised to 100. Pulse rate 80 to 90, respiration normal. He complained of the nausea, and slight pain in the left loin extending around toward the back, at times beyond the posterior axillary line. There were no masses in the abdomen and a marked absence of any tender points. Bowel movements were easily induced with enema, and the urine contained, as above stated, pus and albumin, but no sugar and no casts. The stools were entirely negative, and especially I wish to emphasize the fact that at no time was fat or fatty acids present in the stool, nor was glycosuria ever found, though the urine was tested almost daily during the entire illness.

Blood examination showed 5,400,000 red cells, hemoglobin 80 to 85, white cells 23,000 to 24,160, with 88 per cent p. m. n., 12 per cent lymphocytes (5 small and 7 large). blood chemistry January 21st showed urea nitrogen 28.50, creatinin 1.88.

On account of persistent nausea no examination of the stomach with barium could be done. Fluoroscopy of the

chest, afterwards corroborated by roentgenography, gave very dense mediastinal shadows almost obliterating the left border of the heart, and extending above and to the outside of the aortic arch, as well as to the right of the heart strip on the other side. These shadows did not pulsate, and on account of their density were assumed to be probably due to new growths. At no time were there any symptoms referable to the chest except a temporary pleuritic pain on the left side, for which nothing could be found at autopsy.

On account of the absence of fever, the persistence of nausea and vomiting, the leukocytosis together with the *x*-ray picture in the chest, it seemed most likely even in the absence of a mass in the abdomen that the patient was suffering from new growth in the stomach and mediastinum. Death occurred on February 7th from asthenia.

Omitting the details unessential to the diagnosis, the autopsy findings were as follows:

The abdomen contains only a very small amount of clear fluid. The appendix is long, thin and adherent behind the cecum. It has the consistency of a fibrous cord. There are old fibrous bands between the gallbladder and the hepatic flexure of the colon, and the colon and duodenum. The omentum is adherent to the left costal margin.

The heart showed some degenerative changes but no gross valvular lesions. Coronaries not narrow. The lungs are light. No palpable nodules.

The liver weighed 2,140 grams. The cut surface showing very definite yellowish tinge. The gallbladder is dilated but not thickened, and there are no calculi in the cavity. The ducts are patent.

The stomach. There are no lesions of the mucous membranes. A semi-fluctuant mass protrudes into the fundus a short distance outside the stomach. No lesions are found anywhere in the gastrointestinal tract.

On cutting through the foramen of Winslow, cloudy fluid, similar to that previously mentioned, appears, but not in marked quantity. On separating the colon a cavity is entered which is at first thought to be the cavity of the stomach but it proves to be the markedly thickened lesser peritoneal cavity filled with cloudy fluid. In the posterior wall of this cavity is seen a yellowish necrotic mass about 2 cm. in diameter. Later investigation shows that this is necrotic pancreatic tissue. To the right of this necrotic mass is a small rounded cavity which on probing is found to lead to the foramen of Winslow. This channel is about 1 cm. in diameter. On following up the pancreatic duct from the ampulla it is found to lead to a necrotic mass about 3 cm. in diameter, involving the tail of the pancreas, and with necrosis extending into the lesser peritoneal cavity. In the adipose tissue about the pancreas, small yellowish nodules are found which grossly strongly suggest fat necroses. The semi-fluctuant mass near the cardiac end of the stomach is found to be an extra-gastric collection of fluid with fat necrosis in its wall.

The genital tract showed no gross changes except the operation scars and a rim of prostatic tissue, the mass of it representing about one-third that of an average prostate. In this is a cavity about 1 cm. in diameter and irregular in outline.

The lymph nodes at the bifurcation of the trachea are moderately enlarged and show much coal pigment but in a few of them grayish white translucent areas are present, the largest of these measuring about 1 cm. in diameter and somewhat suggestive of tumor, although they may be hyperplastic lymphoid tissue. No lesions in the pre-aortic or pelvic lymph nodes. Marked enlargement of lymph nodes at the bifurcation of the trachea.

Microscopic examination showed marked tubular injury and arteriosclerotic change in the kidney. Prostate: no evidence of malignancy. Tracheobronchial lymph node: marked hyperplasia with necrosis but no evidence of carcinoma. Pancreas: extensive acute and chronic changes, the acute changes being ante-mortem necrosis with extensive leucocytic infiltration about these necroses, the chronic change being marked inter- and intralobular fibrosis.

DIAGNOSES

1. Suppurative pancreatitis.
2. Cloudy swelling of myocardium with epicardial petechial hemorrhages.
3. Fatty liver.

It will be seen that there are interesting features to this case from both the diagnostic and pathologic viewpoints. I believe it is safe to say that his condition was impossible to diagnose clinically. There was nothing in the physical examination, his symptoms, nor the laboratory findings which would lead one to look for a lesion in the pancreas. His presenting trouble was the constant nausea and persistent vomiting with increase of his white blood cells and absence of fever. It was evident at autopsy that there was enough functionating pancreas left to explain why there was no free fat in his stools, nor sugar in his urine.

A little later another patient was seen with a very much distended abdomen, absence of fever, and pain which prevented his lying down. This had been present only a few days. Previous health had been unusually good. The man, about 60 years old, was in active business life. The pain was epigastric. There was some vomiting but not persistent. There was almost no rise of temperature, but a white blood count between 18,000 and 20,000. In the region of the gallbladder there was a palpable mass somewhat tender to touch. In the epigastrium a tumor could be palpated, but its form and size were difficult to make out.

The abdomen was very tense like that found in serositis of the liver ascites. However, the dullness to percussion was entirely left-sided. The urine was sugar free. *X*-ray of the stomach showed a peculiar shape—a sort of teapot dome effect—in that the prepyloric antrum was narrowed to the size of a thumb for a distance from three to four inches. Gastric analysis was negative, free fat being found in the stools. Consultation with the surgeon was urged on the ground that surgical exploration of the pancreas should not be longer delayed. I will ask Dr. Mann to speak of this case from the surgical side, as he operated upon him.

DISCUSSION

DR. MANN: On examination this man presented two masses which could be felt. One, a low bulging mass in the epigastrium, and the other a sort of roughened mass in the gallbladder region but a little outside of that region. His symptoms were centered about the center of the ab-

domen; the pain was constant and rather intense. Having seen a few cases of pancreatic cyst and knowing that is about the only thing which presents a tumor which can be seen or felt in the epigastrium, I made a diagnosis of pancreatic cyst (provisional). At operation a mass presented exactly where the pancreas would be, about half the size of a croquet ball, rounded on one side, and at one point did have a cyst about the size of a large marble, so my diagnosis checked up with that in a small way. I made a small opening into this mass and we got some lobulated material from 1 cm. to 2 cm. long about the consistency of oysters, but did not get very much of it. On microscopic examination that proved to be lymphosarcoma. The mass on the left side of the liver was rolled up omentum.

This man stood the operation very well. He died today, over four weeks after his operation. He has had no pain since the operation. I presume it was the tension on that capsule which caused the pain.

The *x*-rays were as Dr. Cross has stated, and the diagnosis of the roentgenologist was carcinoma of the stomach, which we rather doubted. I presume a sarcoma of the retroperitoneal lymph glands beginning probably in some gland close in near the head of the pancreas.

DR. HEAD: I would like to ask Dr. Cross two questions. First, in the first case reported, did the man show evidence of profound prostration or exhaustion indicative of a serious organic condition, or did the clinical picture present more of a toxic state? Second, how long from the onset of the symptoms was it before the patient died?

DR. CROSS (in closing): It is hard to tell just when this process started. I imagine that the stag dinner furnished the stimulus, after which things eventuated rather rapidly, but that he had the beginnings of this process in the pancreas for some time before. Of course that is speculation. The stag dinner took place on the 5th of January; I saw him on the 9th, and he died on February 7th. He was not markedly prostrated.

I want to mention the fact again that leucocytosis without fever was present in both of these cases. In the one case the pancreas was five or six times as large as a normal pancreas. There was almost no free fluid in the abdomen, and the distension of the abdomen was due to the increased size of the pancreas. I should be very suspicious again with a leucocytosis of 24,000 and absence of fever.

He was not prostrated, but he was nauseated almost continuously. There was no mass to be felt anywhere. He had pleuritic pain for a few days.

Another case of pancreatitis had exactly the same pain, but higher up. It might have been described in the same terms that one would describe splenic infarct.

He presented no symptoms of obstruction of the bowel; never had any difficulty with bowel movements.

6. DR. A. SCHWYZER showed several *x*-ray films of a case of empyema following pneumonia in a boy 11 years of age. Trocar and cannula were inserted and the cavity Dakinized.

The meeting adjourned.

JOHN E. HYNES,
Secretary.

BOOK REVIEWS

BOOKS RECEIVED FOR REVIEW

THE ANTIDIABETIC FUNCTIONS OF THE PANCREAS AND THE SUCCESSFUL ISOLATION OF THE ANTIDIABETIC HORMONE—INSULIN. J. J. R. MacLeod, Prof. of Physiology, University of Toronto, and F. G. Banting, Research Professor, University of Toronto. Series No. 2. 69 pages. Illus. St. Louis: C. V. Mosby Co., 1923. Cloth, $1.50.

METHODS IN MODERN MEDICINE. The Manual of the Medical Service of George Dock, M.D., Sc.D. George R. Herrmann, M.D., Ph.D., Instructor in Medicine, University of Michigan. 521 pages. Illus. St. Louis: C. V. Mosby Co., 1924.

SOCIAL CONTROL OF THE FEEBLEMINDED. A Study of Social Programs and Attitudes in Relation to the Problems of Mental Deficiency. Stanley P. Davies, Ph.D., Exec. Secy. Committee on Mental Hygiene, New York State Charities Aid Association. 207 pages. New York: The National Committee for Mental Hygiene, Inc., 370 Seventh Avenue, 1923. Paper, $1.25.

"OBSTETRICS FOR NURSES." Charles B. Reed, M.D., St. Louis, C. V. Mosby Co. Second Edition, 1923. Price, $3.50.

So many of the present-day books intended for the instruction of the nurse-in-training and for the guidance of the post-graduate obstetric nurse, seem to the reviewer to have as their greatest aim the teaching of the scientific and theoretical phase (thus almost obscuring the more important practical side of the subject), that it is a great pleasure to him to read one that departs from the usual.

Such a book is Reed's "Obstetrics for Nurses" which is now in its second edition. In its 390 pages of text, this little book covers in a very satisfactory way all that the nurse who wishes to make obstetric-nursing her specialty, needs to master of the anatomy and physiology of the female generative organs, including pre-natal, lying-in, and post-partum care. The diction is throughout clear and concise and the one hundred and forty-four illustrations are for the most part well chosen. There are twenty-five chapters in all, the last seven taking up Care of the Child, Cleanliness and Sterilization, Diets, and a Therapeutic Index with an appended glossary of more or less special terms and phrases.

In the first thirty-six pages there is given an easily understandable discussion of the anatomy and physiology of the pelvic organs with special emphasis on their relation to normal pregnancy. Next, there are four chapters on abnormal, as well as normal, pregnancy, including the Hygiene of Normal Pregnancy, a chapter that could well be read with benefit by every practitioner, reflecting as it does the present-day sound, common-sense ideas on this

subject. Following in orderly arrangement are three chapters dealing with normal labor, its course, mechanism and the nurse's duties throughout its conduct, both in the home and in the hospital. The normal puerperium is next considered in detail, and thereafter are seven chapters on the abnormalities and complications of labor and the puerperium, including one on Infections and one on Minor Operations (special technique for the nurse).

All in all, Dr. Reed's "Obstetrics for Nurses" is a distinct improvement over the usual style of books intended for a like purpose and which are so frequently mere abridged editions of the larger text-books on obstetrics. It is above all practical and the nurse who studies with it as her guide will, I am sure, be more than ever a valuable and efficient assistant to the obstetrician.

ROGER S. COUNTRYMAN, M.D.

MENTAL DISORDERS. An Introduction to the Study of Mental Disorders. By Francis M. Barnes, Jr., M.A., M.D., Associate Professor of Nervous and Mental Diseases in the St. Louis University Medical School, Neurologist to St. Mary's Hospital, Consultant Neurologist to St. John's Hospital, Consultant Psychiatrist to the St. Louis City Sanitarium, Consultant Neuropsychiatrist to the U. S. Veterans' Bureau, Ninth District, St. Louis. Second Edition. C. V. Mosby Company, St. Louis, 1923.

The purpose is to give in brief outline the important features of some of the more common types of mental diseases; the groups considered are ones presented before fourth year students' clinics. The second edition was prepared, the author states, in response to the request from teachers that the notes be made available to other students than those in Dr. Barnes' classes.

More than half the book consists of a historical introduction that is very interesting and instructive and of a discussion of various psychological features concerned in mental processes.

Part II discusses briefly various common types of psychoses, together with a discussion of psychoneuroses and defective states.

The author states that it has not been his purpose to write a complete treatise on psychiatry but to place in students' hands a brief outline of fundamentals of psychiatry.

It is written in an interesting manner and each chapter is complete in itself so that it may be used readily. It will be found of interest to those whose work is limited to psychiatry and of help not only to the undergraduate student but to the practitioner who wishes something covering the field of psychiatry that is not too exhaustive.

EDWARD J. ENGBERG.

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Ransom, L. M. ..... Hancock
Shelver, H. J. ..... Ortonville
Weir, J. D. ..... Beardsley

Park Region District Medical Society

Ottertail, Douglas, Grant and Wilkin Counties
Regular meetings, second Wednesday in January, April, July and October
Annual meeting in October

President
Wray, W. E. ..... Campbell
Secretary
Paulson, Theo. S. ... Fergus Falls

Baker, A. C. ..... Fergus Falls
Boysen, P. ..... Pelican Rapids
Brabec, F. J. ..... Perham
Broker, W. S. ..... Battle Lake
Burnap, W. L. ..... Fergus Falls
Cowing, P. G. ..... Evansville
Drought, W. W. ..... Fergus Falls
Esser, John ..... Perham
Estrem, C. O. ..... Fergus Falls
Freeborn, J. A. ..... Fergus Falls
Goodson, Catherine M. Retreat, Pa.
Hand, W. R. ..... Elbow Lake
Haskell, A. D. ..... Alexandria
Haugan, O. M. ..... Fergus Falls
Haugen, G. T. ..... Fergus Falls
Kittelson, Theo. N. Fergus Falls
Lee, W. A. ..... Fergus Falls
Lewis, A. J. ..... Henning
Liebold, H. H. ..... Parkers Prairie
Love, Fred A. ..... Carlos
McCann, G. E. ..... Onamia
Meckstroth, C. N. ..... Brandon
Naegeli, Frank ..... Fergus Falls
Nelson, O. N. ..... Battle Lake
Otto, H. C. ..... Frazee
Parson, L. R. ..... Elbow Lake
Patterson, W. L. ..... Fergus Falls
Paulson, Theo. ..... Fergus Falls
Powers, F. W. ..... Barrett
Reeve, E. T. ..... Elbow Lake
Satersmoen, Theo. Pelican Rapids
Schneider, Clarence L. Deer Creek
Sherping, O. Th. ..... Fergus Falls
Vail, J. B. ..... New York Mills
Vigen, J. G. ..... Fergus Falls
Wray, W. E. ..... Campbell

SECOND DISTRICT

COUNCILOR, J. G. MILLSPAUGH, M. D. (2 years) ..... Little Falls

Aitkin County Medical Society

Regular meetings, first Monday in each month
Annual meeting, first Monday in December

President
Graves, Carlton ..... Aitkin
Secretary
Ratcliffe, J. J. ..... Aitkin

Catlin, T. J. ..... Palisade
Graves, C. ..... Aitkin
Kelly, B. W. ..... Aitkin
Kerlan, S. Z. ..... McGregor
McHugh, R. F. ..... Aitkin
Ratcliffe, J. J. ..... Aitkin

Upper Mississippi Medical Society

Crow Wing, Morrison, Cass, Todd, Wadena, Clearwater, Koochiching, Hubbard and Beltrami Counties

Regular meetings in May and January
Annual meeting, January

President
Johnson, E. W. ..... Bemidji
Secretary
Badeaux, G. I. ..... Brainerd

Agnew, A. T. ..... Bertha
Allen, F. A. ..... Crosby
Allen, F. H. ..... Staples
Badeaux, G. I. ..... Brainerd
Beise, R. A. ..... Brainerd
Bone, Merle ..... Kelliher
Button, A. J. ..... Hackensack
Cantwell, W. F. .. Internat'l Falls
Campbell, D. R. ..... Bagley
Christie, G. R. ..... Long Prairie
Christie, R. L. ..... Long Prairie
Corrigan, J. E. ..... Spooner
Courtney, Walter ..... Brainerd
Craig, C. C. .... International Falls
Crowl, Verne C. ..... Bertha
Davis, L. T. ..... Wadena
Davis, T. C. ..... Wadena
Derauf, B. I. ..... Brainerd
Douglas, H. E. ..... Blackduck

Douglass, J. E. .. State Sanatorium
Forrest, C. G. ..... Clearbrook
Garlock, A. V. ..... Bemidji
Garlock, D. H. ..... Bemidji
Gerber, Milo P. ..... Brainerd
Geyman, M. J. ..... Browerville
Ghostley, Mary C. Internat'l Falls
Goodheart, C. J. ..... Akeley
Gilmore, R. ..... Bemidji
Halenbeck, P. L. ..... Crosby
Hall, P. M. ..... State Sanatorium
Halper, Philip ..... St. Paul
Healy, R. J. ..... Pierz
Holman, E. E. ..... Pine River
Holst, C. F. ..... Little Falls
Holst, J. B. ..... Little Falls
House, Z. E. ..... Cass Lake
Houston, C. A. ..... Park Rapids
Hooslef, J. ... International Falls
Johnson, E. W. ..... Bemidji
Johnson, O. V. ..... Sebeka
Kenyon, Paul ..... Wadena
Laney, R. L. ..... Puposky
McCann, D. F. ..... Bemidji
Marcum, E. H. ..... Bemidji
Miller, W. A. ..... New York Mills

Millspaugh, J. G. ..... Little Falls
Morell, W. N. ..... Verndale
Nelson, Nesmuth ..... Brainerd
Nicholson, Jos. ..... Brainerd
Nordin, C. G. ..... Brainerd
Parrott, B. W. ..... Long Prairie
Pengelly, E. J. ..... Ironton
Pierce, Chas. H. ..... Wadena
Prendergast, H. J. ..... Brainerd
Roberts, L. M. ..... Little Falls
Shannon, S. S. ..... Crosby
Smith, B. A. ..... Crosby
Smith, E. H. ..... Bemidji
Smith, W. H. ..... Cass Lake
Stewart, O. E. ..... Bemidji
Thabes, J. A. ..... Brainerd
Van Valkenburg, B. F. ..... Long Prairie
Waldie, Geo. McL. ..... Wabasha
Watson, A. M. ..... Royalton
Watson, J. D. ..... Holdingford
Wilcox, F. L. ..... Walker
Will, W. W. ..... Bertha
Williams, R. J. ..... Pine River
Withrow, M. E. .. Internat'l Falls
Woolway, C. J. ..... Deerwood

THIRD DISTRICT

COUNCILOR, H. LONGSTEET TAYLOR, M. D. (2 years) ..... St. Paul

Ramsey County Medical Society

Regular meetings, last Monday of each month except June, July and August
Annual meeting last Monday in January

President
Larsen, C. L. ..... St. Paul
Secretary
Chatterton, C. C. ..... St. Paul

Abbott, J. S. ..... St. Paul
Abramovich, J. H. ..... St. Paul
Ahrens, A. E. ..... St. Paul
Ahrens, A. H. ..... St. Paul
Alden, J. F. ..... St. Paul
Aldes, Harry ..... St. Paul
Alexander, F. H. ..... St. Paul
Allen, Mason ..... St. Paul
Anderson, W. T. ..... St. Paul
Arends, A. T. ..... St. Paul
Armstrong, J. M. ..... St. Paul
Arnquist, A. S. ..... St. Paul
Arouni, Khalil ..... St. Paul
Arzt, C. P. ..... St. Paul
Bacon, Donald K. ..... St. Paul
Bacon, Knox ..... St. Paul
Bacon, L. C. ..... St. Paul
Balcome, F. E. ..... St. Paul
Ball, C. R. ..... St. Paul
Barry, L. W. ..... St. Paul
Barsness, Nellie ..... St. Paul
Beadie, W. D. ..... Cannon Falls
Beals, Hugh ..... St. Paul
Beckley, F. L. ..... St. Paul
Bell, C. C. ..... St. Paul
Benepe, L. M. ..... St. Paul
Bennion, P. H. ..... St. Paul
Bentley, Norman P. ..... St. Paul

Berrisford, Paul D. ..... St. Paul
Binger, H. E. ..... St. Paul
Birnberg, T. L. ..... St. Paul
Bock, R. A. ..... St. Paul
Boeckmann, Eduard .... St. Paul
Boeckmann, Egil ..... St. Paul
Bohland, E. H. ..... St. Paul
Bole, R. S. ..... St. Paul
Boleyn, E. S. ..... Stillwater
Bolstad, H. C. ..... St. Paul
Bosworth, Robinson .... St. Paul
Brand, G. D. ..... St. Paul
Bray, E. R. ..... St. Paul
Brimhall, J. B. ..... St. Paul
Brodie, Walter D. ..... St. Paul
Brooks, D. F. ..... St. Paul
Brooks, G. F. ..... St. Paul
Brown, Edw. I. ..... St. Paul
Brown, John C. ..... St. Paul
Brown, LeRoy ..... St. Paul
Burch, F. E. ..... St. Paul
Burfiend, G. H. ..... St. Paul
Burns, F. W. ..... St. Paul
Burns, R. M. ..... St. Paul
Buscher, H. ..... St. Paul
Caldwell, Kenneth S. .... St. Paul
Cameron, J. A. ..... St. Paul
Campbell, J. E. .... South St. Paul
Cannon, Harry ..... St. Paul
Carman, C. L. ..... St. Paul
Carman, Paul I. ..... St. Paul
Carroll, Wm. C. ..... St. Paul
Cavanaugh, J. O. ..... St. Paul

Chandler, O. B. ..... St. Paul
Chatterton, C. C. ..... St. Paul
Christiansen, A. ..... St. Paul
Christison, J. T. ..... St. Paul
Clark, T. C. .. Soldiers Home, Mpls.
Cobb, S. G. ..... St. Paul
Colby, Woodard ..... St. Paul
Cole, Wallace ..... St. Paul
Collie, H. G. ..... St. Paul
Colvin, A. R. ..... St. Paul
Comstock, A. E. ..... St. Paul
Conner, Wm. H. ..... St. Paul
Connor, C. E. ..... St. Paul
Cook, Paul B. ..... St. Paul
Countryman, Roger S. .... St. Paul
Cowern, E. W. .... North St. Paul
Dack, L. G. ..... St. Paul
Darling, J. B. ..... St. Paul
Daugherty, E B. ..... St. Paul
Daugherty, L. E. ..... St. Paul
Davis, Herbert ..... St. Paul
Davis, William ..... St. Paul
Dedolph, K. ..... St. Paul
Dickson, Thos. H., Jr. .... St. Paul
Dittman, Geo. C. ..... St. Paul
Dohm, A. J. ..... St. Paul
Donohue, P. F. ..... St. Paul
Drake, Carl B. ..... St. Paul
Dunn, J. N. ..... St. Paul
Earl, Geo. A. ..... St. Paul
Earl, Robert O. ..... St. Paul
Edlund, G. ..... St. Paul
Ely, O. S. ..... South St. Paul

Engberg, E. J.....St. Paul
Ernest, G. C.....St. Paul
Eshelby, E. C.....St. Paul
Evert, John A.....St. Paul
Ferguson, J. C.....St. Paul
Fesler, Harold H.....St. Paul
Flagstad, A. E.....St. Paul
Fogarty, C. W.....St. Paul
Foley, F. E. B.....St. Paul
Freeman, C. D.....St. Paul
Fulton, J. F.....St. Paul
Furber, W. W.....Cottage Grove
Gager, E. C.....St. Paul
Gardiner, D. G.....St. Paul
Geer, Everett K.....St. Paul
Geissinger, John D.....St. Paul
Geist, Geo. A.....St. Paul
Ghent, Harry.....St. Paul
Ghent, M. M.....St. Paul
Gibre, E. O.....St. Paul
Gillilan, J. S.....St. Paul
Ginsberg, Wm.....St. Paul
Goltz, E. V.....St. Paul
Gotham, C. L.....St. Paul
Gratzek, Thos.....St. Paul
Greene, C. L.....St. Paul
Greenhagen, Arnold P...St. Paul
Hagaman, Geo. K.....St. Paul
Hall, A. R.....St. Paul
Hammes, E. M.....St. Paul
Hammond, J. F.....St. Paul
Hauser, Victor.....St. Paul
Hawkins, V. J.....St. Paul
Heath, A. C.....St. Paul
Hengstler, W. H.....St. Paul
Hensel, C. N.....St. Paul
Heron, Roy C.....St. Paul
Herrmann, E. T.....St. Paul
Heseltine, V. G.....Taylors Falls
Hesselgrave, S. S.....St. Paul
Hilger, A. W.....St. Paul
Hilger, D. D.....St. Paul
Hilger, L. A.....St. Paul
Hoff, Alfred.....St. Paul
Hoff, Peder A.....St. Paul
Hoffman, Max H.....St. Paul
Holcomb, J. T.....St. Paul
Holcomb, O. W.....St. Paul
Holl, P. M.....Minneapolis
Howard, M. A.....St. Paul
Howard, Wm. H.....Minneapolis
Howard, W. S.....St. Paul
Hullsiek, H. E.....St. Paul
Hultkrans, Joel C.....St. Paul
Hunt, H. E.....St. Paul
Ide, Arthur W.....St. Paul
Ingerson, C. A.....St. Paul
Jesion, J. W.....St. Paul
Johnson, Asa M.....St. Paul
Johnson, Hartland C.....St. Paul
Johnson, T. H.....St. Paul
Jones, E. M.....St. Paul
Kannary, E. L.....St. Paul
Kelly, John V.....St. Paul
Kelly, Paul H.....St. Paul
Kesting, Herman.....St. Paul
King, Walter E.....St. Paul
Kistler, A. S.....St. Paul
Klein, H. N.....St. Paul

Knauff, M. K.....St. Paul
Kvitrud, G.....St. Paul
Langenderfer, F. V.....St. Paul
Larsen, C. L.....St. Paul
Larson, M. L.....St. Paul
Leahy, B.....St. Paul
Leavenworth, R. O.....St. Paul
Leitch, Archibald.....St. Paul
Lepak, John A.....St. Paul
Lerche, William.....St. Paul
Lewis, J. B.....South St. Paul
Lewis W. W.....St. Paul
Lick, C. L.....St. Paul
Little, W. J.....St. Paul
Lufkin, H. M.....St. Paul
Lundholm, A. M.....St. Paul
McCarthy, W. R.....St. Paul
McClanahan, J. H...White Bear
McClanahan, T. S. ...White Bear
McCloud, C. N.....St. Paul
McDavitt, Thomas.....St. Paul
McKeon, Owen.....St. Paul
McLaren, Jennette M.....St. Paul
McNevin, C. F.....St. Paul
MacLaren, Archibald....St. Paul
Maloney, T. J.....St. Paul
Martineau, J. L.....St. Paul
Meyerding, E. A.....St. Paul
Mintener, John W.....St. Paul
Mitchell, Frederick.....St. Paul
Mogilner, S. N.....St. Paul
Molander, H. A.....St. Paul
Morris, R. Edwin.....St. Paul
Morrissey, F. B.....St. Paul
Morse, Russell W.....St. Paul
Mortenson, N. G.....St. Paul
Moss, Myer N.....St. Paul
Moynihan, T. J.....St. Paul
Murphy, E. F.....St. Paul
Myers, Thos.....St. Paul
Neher, F. H.....St. Paul
Nelson, L. A.....St. Paul
Nichols, A. E.....St. Paul
Nippert, H. T.....St. Paul
Norris, E. H.....St. Paul
Nye, Katherine A.....St. Paul
Nye, Lillian.....St. Paul
O'Brien, H. J.....St. Paul
O'Connor, J. P.....St. Paul
O'Connor, J. V.....St. Paul
Oerting, Harry.....St. Paul
Ogden, Warner.....St. Paul
Ohage, Justus.....St. Paul
Ohage, Justus, Jr.....St. Paul
Olson, Chas. A.....St. Paul
Ostergren, E. W.....St. Paul
Pearson, F. R.....St. Paul
Pedersen, A. H.....St. Paul
Perry, C. G.....St. Paul
Peterson, V. N.....St. Paul
Pine, Auten A.....St. Paul
Plondke, F. J.....St. Paul
Platt, J. J.....St. Paul
Ramsey, W. R.....St. Paul
Richards, E. T. F.....St. Paul
Richardson, H. E.....St. Paul
Riggs, C. Eugene.....St. Paul
Ritchie, H. P.....St. Paul
Rogers, John T.....St. Paul

Rothrock, J. L.....St. Paul
Rothschild, H. J.....St. Paul
Roy, Philemon.....St. Paul
Ruhberg, Geo. N.....St. Paul
Russell, H. R.....St. Paul
Rutherford, W. C.....St. Paul
Ryan, John J.....St. Paul
Satterlund, V. L.....St. Paul
Savage, F. J.....St. Paul
Schatz, F. J.....St. Paul
Schoch, R. B. J.....St. Paul
Schons, E.....St. Paul
Schuldt, F. C.....St. Paul
Schulze, Albert G.....St. Paul
Schwyzer, Arnold.....St. Paul
Shellington, M. A.....St. Paul
Senkler, G. E.....St. Paul
Shannon, W. Ray.....St. Paul
Shapere, A. D.....St. Paul
Sheilman, John L.....St. Paul
Shimonek, Anton.....St. Paul
Simon, B. F.....St. Paul
Simon, Geo. H.....St. Paul
Skinner, H. O.....St. Paul
Snyder, Geo. W.....St. Paul
Sohlberg, Olof.....St. Paul
Sprafka, J. M.....St. Paul
Staley, J. C.....St. Paul
Steen, A. H.....Cottage Grove
Sterner, E. G.....St. Paul
Sterner, O. W.....St. Paul
Stevens, F. A.....Lake Elmo
Stewart, Alexander.....St. Paul
Stierle, Adolph.....St. Paul
Stinnette, S. E.....St. Paul
Stolpestad, H. L.....St. Paul
Swanson, Edwin O.....St. Paul
Sweeney, Arthur.....St. Paul
Swendson, J. J.....St. Paul
Taylor, H. L.....St. Paul
Teisberg, C. B.....St. Paul
Thauwald, C. C.....St. Paul
Tiber, L. J.....St. Paul
Van Norman, K. H.....St. Paul
Van Slyke, Chas. A.....St. Paul
Von der Weyer, William.St. Paul
Waas, Chas.....St. Paul
Wald, K. H.....St. Paul
Walker, R. E.....St. Paul
Wallinga, John H.....St. Paul
Walters, B. Frank.....St. Paul
Warner, E. F.....St. Paul
Warren, E. L.....St. Paul
Warnock, R. W.....St. Paul
Warwick, Margaret.....St. Paul
Welch, M. C.....St. Paul
Wheeler, M. W.....St. Paul
Whitacre, J. C.....St. Paul
Whitcomb, Ed. H.....St. Paul
White, J. S.....St. Paul
Whitmore, F. W.....St. Paul
Whitney, A. W.....St. Paul
Williams, Clayton.....St. Paul
Winnick, J. B.....St. Paul
Wold, K. C.....St. Paul
Wood, H. G.....St. Paul
Ylvisaker, L. S.....St. Paul
Zander, C. H.....St. Paul
Zimmerman, H. B.....St. Paul

Washington County Medical Society

Regular meetings held on second Tuesday of the odd numbered months
Annual meeting, November

President
Landeen, F. G.....Stillwater
Secretary
Josewski, R. J.....Stillwater
Brown, A. E.....Stillwater

Freligh, E. O.....Stillwater
Haines, J. H.....Stillwater
Humphrey, W. R.....Stillwater
Johnson, Walfred.....Stillwater
Josewski, R. J.....Stillwater
Kalinoff, D.....Stillwater
Landeen, F. G.....Stillwater

Mingo, F. E.....Hugo
Newman, G. A.....Stillwater
Poirier, J. A.....Forest Lake
Sherman, C. H.....Bayport
Stuhr, J. W.....Stillwater
Thompson, V. C.....
Marine-on-St. Croix

Chisago-Pine County Medical Society

Annual meeting, second Tuesday in May

President
Dredge, H. P.....Sandstone
Secretary
Kelsey, C. G.....Hinckley
Bohling, B. S.....Sandstone

Dredge, H. P.....Sandstone
Ehmke, W. C.....Willow River
Flom, A. O.....Chisago City
Freymiller, E. F.....Cloverton
Gray, Clyde E.....Rush City
Gunz, A. W.....Center City

Kelsey, C. G.....Hinckley
Paulson, C. W.....North Branch
Stowe, A. J.....Rush City
Tilton, A. J.....Alden
Wiseman, Robert L.....Pine City
Zeien, Thos.....North Branch

Central Minnesota District Medical Society

Mille Lacs, Sherburne, Isanti, Anoka and Kanabec Counties
Regular meetings, July and October
Annual meeting, July

President
Swenson, Charles .....Braham
Secretary
Cooney, H. C.....Princeton

Bossert, C. S.....Mora
Caine, A. T.....Anoka

Caley, G. R.....Princeton
Cooney, H. C.....Princeton
Gates, C. E.....Anoka
Hall, E. L.....Princeton
Norrgard, H. T.....Milaca
Peterson, A. A.....Mora
Roadman, I. M.....Ponsford

Roehlke, A. B.....Elk River
Shulean, N. S.....Cambridge
Spurzem, R. J.....Anoka
Stocking, F. F.....Milaca
Swennes, O. S.....Wahkon
Swenson, Charles .....Braham
Vrooman, F. E.....St. Francis

St. Louis County Medical Society

St. Louis, Cook, Lake, Itasca and Carlton Counties
Regular meetings, second Thursday of each month
Annual meeting, second Thursday in October

President
Martin, T. R.....Duluth
Secretary
Magney, F. H.....Duluth

Abbott, Wm. P.....Duluth
Adams, B. S.....Hibbing
Anderson, Hilding C.....Duluth
Arminen, K. V.....Duluth
Armstrong, E. L.....Duluth
Athens, A. S.....Buhl
Ayers, G. T.....Ely
Bagley, W. R.....Duluth
Barney, L. A.....Duluth
Barrett, Fred .....Gilbert
Berdez, G. L.....Duluth
Bergquist, K. E.....Duluth
Binet, H. E.....Grand Rapids
Blacklock, S. S.....Hibbing
Blakely, C. C.....Barnum
Bouman, P. G.....Duluth
Bowen, R. L.....Hibbing
Boyer, S. H.....Duluth
Braden, A. J.....Duluth
Bradley, E. L.....Duluth
Bray, C. W.....Biwabik
Briggs, F. W.....Duluth
Bullen, F. W.....Hibbing
Burns, H. J.....Duluth
Burns, R. L.....Two Harbors
Carstens, C. F.....Hibbing
Chapman, T. L.....Duluth
Cheney, E. L.....Duluth
Christenson, E. P...Two Harbors
Clark, F. F.....Duluth
Collins, A. N.....Duluth
Collins, H. C.....Duluth
Cosgrove, J. H.....Duluth
Coventry, W. A.....Duluth
Crowe, J. H.....Virginia
Daniels, H. A.....Eveleth
Davis, B. F.....Duluth
Davis, H. S.....Duluth
Dixon, J. F.....Carlton
Doolittle, L. E.....Duluth
Doyle, Geo. C.....Duluth
Drenning, F. C.....Duluth
Durgin, F. L.....Nopeming
Eckman, P. F.....Duluth
Eisenman, W. F.....Chisholm
Ekblad, J. W.....Duluth
Eklund, W. J.....Duluth
Elias, F. J.....Duluth
Eppard, R. M.....Cloquet
Estrem, T. A.....Hibbing
Ewens, H. B.....Virginia
Fahey, E. W.....St. Paul
Ferreira, G. J.....Aurora
Fleming, J.....Cloquet
Forbes, R. S.....Duluth
Fuerste, Frederick.....Proctor
Gardner, R. D.....Eveleth
Gauthier, W.....Virginia

Gendron, J. F.....Grand Rapids
Gilbert, J. D.....Carlton
Gillespie, M. G.....Duluth
Gillespie, N. H.....Duluth
Giroux, A. A.....Duluth
Goodman, C. E.....Virginia
Graham, David.....Duluth
Graham, Reginald.....Duluth
Graham, Robert.....Duluth
Grawn, F. A.....Duluth
Greeley, L. Q.....Duluth
Ground, H. T.....Virginia
Grover, F. E.....Duluth
Hall, A. E.....Virginia
Hall, A. E.....Kasson
Haney, C. L.....Duluth
Harris, C. N.....Nashwauk
Hastings, D. R.....Duluth
Hatch, W. E.....Duluth
Hayes, M. F.....Nashwauk
Heimark, O. E.....Duluth
Hicks, F. A.....Grand Marais
Hill, F. E.....Duluth
Hirschboeck, F. J.....Duluth
Hirschfield, M. S.....Duluth
Hovde, H.....Duluth
Hursch, M. M.....Grand Rapids
Jensen, T. J.....Duluth
Kean, N. D.....Coleraine
Keyes, C. R.....Duluth
Kiesling, I. H.....Nashwauk
King, Wm. S.....Eveleth
Klein, H.....Duluth
Knapp, F. N.....Duluth
Kohlbry, C. O.....Duluth
Kraft, P.....Duluth
Kuth, J. R.....Duluth
Laird, A. T.....Nopeming
Lampson, H. G.....Duluth
Lenont, C. B.....Virginia
Lepak, F. J.....Duluth
Lindgren, E. I.....Duluth
Litman, Samuel, N..Meadowlands
Loofbourrow, E. H.....Keewatin
Lum, C. E.....Duluth
Lynam, F.....Duluth
McCarthy, Paul D.....Babitt
McComb, C. F.....Duluth
McCoy, Mary.....Duluth
McCuen, J. A.....Duluth
McDonald, A. L.....Duluth
McGiffert, E. N.....Duluth
McHaffie, O. L.....Duluth
McIntyre, E. H.....Virginia
McMurtrie, W. D.....Marble
McNutt, John R.....Two Harbors
Magie, W. H.....Duluth
Magney, F. H.....Duluth
Manley, J. R.....Duluth
Martin, T. R.....Duluth
Mattill, P. M.....Oak Terrace
Merriman, L. L.....Duluth
Miller, Walter H.....Buhl
Miners, G. A.....Deer River
Monroe, P. B.....Soudan

More, C. W.....Eveleth
Morsman, L. W.....Hibbing
Morss, C. R.....Zumbrota
Murray, D. D.....Duluth
Nelson, E. H.....Chisholm
Nicholson, M. A.....Duluth
Olson, Albert E.....Duluth
Olson, O. S.....Duluth
Oredson, O. A.....Duluth
Pake, S. G.....Duluth
Paradine, J.....Duluth
Pare, L. T.....Duluth
Parker, O. W.....Ely
Paulson, G. A.....Duluth
Payette, C. H.....Duluth
Pennie, D. F.....Duluth
Perley, A. E.....Chisholm
Powers, J. E.....Duluth
Raadquist, C. S.....Hibbing
Radtke, H. P.....Chisholm
Raihala, J.....Virginia
Raiter, Franklin W. S....Cloquet
Raiter, Roy F.....Cloquet
Reynolds, H.....Hibbing
Rippert, J. A.....Duluth
Robinson, J. M.....Duluth
Rood, D. C.....Duluth
Rowe, O. W.....Duluth
Rudie, P. S.....Duluth
Ryan, J. W.....Duluth
St. Clair, G. G.....Duluth
Scherer, C. A.....Duluth
Schroeder, C. H.....Duluth
Schwartz, A. N.....Duluth
Seashore, D. E.....Duluth
Shapiro, E. Z.....Duluth
Shaw, A. W.....Buhl
Slyfield, F. F.....Duluth
Smith, C. M.....Duluth
Spicer, F. W.....Duluth
Spurbeck, R. G.....Cloquet
Strathern, M. L.....Gilbert
Strobel, W. G.....Duluth
Stuart, A. B.....Cloquet
Sukeforth, L. A.....Duluth
Sutherland, H. N.....Ely
Taylor, A. C.....Duluth
Taylor, C. W.....Duluth
Tibbetts, M. H.....Duluth
Tilderquist, D. L.....Duluth
Tuohy, E. L.....Duluth
Turnbull, F. M.....Duluth
Urberg, S. E.....Duluth
Van de Steeg, Wm. G....Biwabik
Vercellini, C. E.....Duluth
Walker, A. E.....Duluth
Walters, F. R.....Moose Lake
Webber, E. E.....Proctor
Weber, M. L.....Duluth
Webster, H. E.....Duluth
Weirick, H. E.....Duluth
Wilkinson, Stella.....Duluth
Winter, J. A.....Duluth
Young, T. O.....Duluth
Young, V. A.....Duluth

FOURTH DISTRICT

COUNCILOR, W. H. CONDIT (1 year) .....Minneapolis

Hennepin County Medical Society

Regular meetings, first Monday in each month excepting July and August
Annual meeting, first Monday in January

President
Wright, C. B.....Minneapolis
Secretary
La Vake, R. T.....Minneapolis

Abbott, A. W.....Minneapolis
Adair, F. L.....Minneapolis
Aling, C. P.....Minneapolis
Allen, H. W.....Minneapolis

Allison, R. G.....Minneapolis
Anderson, A. E.....Minneapolis
Anderson, Arnt.....Minneapolis
Anderson, D. D.....Minneapolis

Anderson, E. D.....Minneapolis
Anderson, James K.....Deerwood
Annis, H. B.....Minneapolis
Arey, H. C.....Excelsior
Arvidson, C. G.....Minneapolis
Aune, Martin.....Minneapolis
Aurand, W. H.....Minneapolis
Aurness, P. A.....Minneapolis
Avery, J. F.....Minneapolis
Axtmer, A. L.....Minneapolis
Baier, Florence.....Minneapolis
Baker, A. T.....Minneapolis
Baker, E. L.....Minneapolis
Baker, Looe.....Minneapolis
Backe, O. H.....Minneapolis
Baldwin, L. B.....Minneapolis
Bank, Harry E.....Minneapolis
Barber, J. P.....Minneapolis
Barden, Norman.....Minneapolis
Barron, Moses.....Minneapolis
Bass, G. W.....Minneapolis
Baxter, S. H.....Minneapolis
Beard, Archie.....Minneapolis
Beaudoux, H. A.....Minneapolis
Bedford, E. W.....Minneapolis
Bell, J. W., Jr.....Minneapolis
Bell, J. W., Sr.....Minneapolis
Benedict, E. E.....Minneapolis
Benjamin, A. E.....Minneapolis
Benn, F. G.....Minneapolis
Benson, R. D.....Minneapolis
Bessesen, A. N.....Minneapolis
Bessesen, Al. N., Jr...Minneapolis
Bessesen, Daniel H...Minneapolis
Bessesen, Wm. A.....Minneapolis
Bishop, Chas. W.....Minneapolis
Bissell, F. S.....Minneapolis
Blake, James.....Hopkins
Bockman, M. W. H...Minneapolis
Booth, A. E.....Minneapolis
Boquist, E. T. W.....Minneapolis
Boreen, C. A.....Minneapolis
Bouman, H. A. H.....Minneapolis
Bracken, H. M.....New York City
Bratrud, Arthur F...Minneapolis
Brooks, Chas. N.....Minneapolis
Brown, E. J.....Minneapolis
Brown, E. D.....Minneapolis
Brown, R. S.....Minneapolis
Brunkow, C. W.....Minneapolis
Bulkley, Kenneth....Minneapolis
Butler, John.....Minneapolis
Byrnes, W. J.....Minneapolis
Cabot, V. S.....Minneapolis
Calkins, L. A.....Minneapolis
Cameron, Angus L...Minneapolis
Camp, Walter E.....Minneapolis
Campbell, Lowell M..Minneapolis
Campbell, Robert....Minneapolis
Carey, Jas. B.....Minneapolis
Carlaw, Chester M...Minneapolis
Cheleen, S. J.....Minneapolis
Cirkler, A. A.....Minneapolis
Clark, Howard S.....Minneapolis
Condit, W. H.....Minneapolis
Cook, H. W.....Minneapolis
Corbett, J. Frank....Minneapolis
Cosman, E. O.....Minneapolis
Crafts, L. M.....Minneapolis
Cranmer, Richard R..Minneapolis
Cross, John G.....Minneapolis
Crume, Geo. F.....Minneapolis
Curtin, John F.....Minneapolis
Cutts, Geo.....Minneapolis
Dahl, Elmer O.....Minneapolis
Dahl, John A.....Minneapolis
Daniel, Donald H....Minneapolis
Dart, L. D.....Minneapolis
Dezell, Earl K.....Minneapolis
Deziel, G.....Minneapolis
Diehl, Harold S.....Minneapolis
Disen, C. F.....Minneapolis
Doctor, Wm. R.....Minneapolis
Donaldson, C. A.....Minneapolis
Dorge, Richard.....Minneapolis
Dornblaser, H. Bright Minneapolis
Doxey, G. L.....Minneapolis
Drake, Chas. R.....Minneapolis
Dreisbach, N.....Minneapolis
Dumas, Alex. G.....Minneapolis
Dunn, Geo. Robt.....Minneapolis
Dunn, Louis.....Minneapolis
Dunsmoor, F. A.....Minneapolis
Dutton, C. E.....Minneapolis
Egilsrud, Kristian....Minneapolis
Ehrenberg, C. J.....Minneapolis
Eisler, R. Edw.....Minneapolis
Eitel, G. G.....Minneapolis
Ellison, D. E.....Minneapolis
Erb, Fred A.....Minneapolis
Ericson, John G.....Minneapolis
Everlof, J. L.....Minneapolis
Fansler, W. A.....Minneapolis
Farr, R. E.....Minneapolis
Feidt, W. W.....Minneapolis
Fischer, G.....Minneapolis
Fjeldstad, C. Alford..Minneapolis
Fjellman, R. C.....Minneapolis
Fleming, A. S.....Minneapolis
Fleming, C. Filmore..Minneapolis
Flocken, Chas. F.....Minneapolis
Fox, John M.....Minneapolis
Franzen, H. C.....Minneapolis
Gammell, J. H.....Minneapolis
Gardner, E. L.....Minneapolis
Geist, Emil.....Minneapolis
Giessler, Paul W.....Minneapolis
Gilles, F. L.....Minneapolis
Gordon, G. J.....Minneapolis
Gosin, D. F.....Minneapolis
Goss, Harold L.....Minneapolis
Grave, Floyd.....Minneapolis
Green, E. K.....Minneapolis
Groll, S.....Minneapolis
Gunderson, Harley J..Minneapolis
Gunderson, Nels. A...Minneapolis
Habein, Harold C.....Minneapolis
Hacking, Frank.....Minneapolis
Hagen, G. L.....Minneapolis
Haggard, G. D.....Minneapolis
Hall, J. M.....Minneapolis
Hallowell, W. H.....Minneapolis
Hamel, Arnold L.....Minneapolis
Hamel, C. E.....Minneapolis
Hamilton, A. S.....Minneapolis
Hamlin, Geo. B.....Minneapolis
Hannah, H. B.....Minneapolis
Hansen, Erling.....Minneapolis
Hansen, Olga.....Minneapolis
Hare, E. R.....Minneapolis
Harrington, C. D.....Minneapolis
Harrington, F. E.....Minneapolis
Hartzell, Thos. B.....Minneapolis
Haverfield, Addie R..Minneapolis
Hayes, J. M.....Minneapolis
Head, G. D.....Minneapolis
Hearn, Wm. O.....Minneapolis
Hedback, A. E.....Minneapolis
Heim, R. R.....Minneapolis
Helk, H. H.....Minneapolis
Hendrickson, J. F....Minneapolis
Henry, C. E.....Minneapolis
Henry, Myron O.....Minneapolis
Hiebert, J. P.....Minneapolis
Higgins, J. H.....Minneapolis
Hill, Eleanor J.....Minneapolis
Hirschfield, Adolph...Minneapolis
Hoaglund, Arthur W..Minneapolis
Hobbs, C. A.....Minneapolis
Hodge, S. V.....Minneapolis
Hoiland, A. S.....Minneapolis
Holen, T.....Minneapolis
Holm, Geo. A.....Minneapolis
Huenekens, E. J.....Minneapolis
Hughes, L. D.....Minneapolis
Hynes, James.....Minneapolis
Hynes, John E.....Minneapolis
Ikeda, Kano.....Minneapolis
Irvine, H. G.....Minneapolis
Jennings, Mary H....Minneapolis
Jensen, Louis C.....Minneapolis
Jensen, M. J.....Minneapolis
Joannides, Minas.....Minneapolis
Johnson, A. E.....Minneapolis
Johnson, A. Elof.....Minneapolis
Johnson, James A....Minneapolis
Johnson, Julius.....Minneapolis
Johnson, Nimrod A...Minneapolis
Johnson, Odin J.....Minneapolis
Johnson, R. A.....Minneapolis
Jones, G. M.....Minneapolis
Jones, H. W.....Minneapolis
Jones, W. A.....Minneapolis
Josewich, Alex.....Minneapolis
Kennedy, C. C.....Minneapolis
Kennedy, Jane F.....Minneapolis
Kennedy, R. R.....Minneapolis
Kennedy, W. A.....Minneapolis
Kimball, H. H.....Minneapolis
King, W. R.....Minneapolis
Kistler, A. J.....Minneapolis
Kistler, C. M.....Minneapolis
Knight, H. L.....Minneapolis
Knight, R. R.....Minneapolis
Knight, Ralph T.....Minneapolis
Koch, John C.....Minneapolis
Kohler, Geo. A.....Minneapolis
Koller, H. M.....Minneapolis
Koller, L. R.....Minneapolis
Kremer, Walter J....Minneapolis
Kriedt, Daniel .....Minneapolis
Kucera, Wm. J.....Minneapolis
Kusske, A. L.....Minneapolis
Lajoie, J. M.....Minneapolis
Lane, Laura A.....Minneapolis
Lapierre, C. A.....Minneapolis
Laurent, A. A.....Minneapolis
LaVake, R. T.....Minneapolis
Leavitt, H. H.....Minneapolis
Lebowske, Jos. A.....Minneapolis
Lee, H. M.....Minneapolis
Lee, John W.....Minneapolis
Leland, M. N.....Minneapolis
Lemstrom, Jarl.....Minneapolis
Lewis, J. D.....Minneapolis
Lind, C. J.....Minneapolis
Lippman, H. S.....Minneapolis
List, Walter E.....Minneapolis
Litchfield, John.....Minneapolis
Litzenberg, J. C.....Minneapolis
Logefeil, Rudolph....Minneapolis
Long, Jesse.....Minneapolis
Loomis, E. A.....Minneapolis
Lundgren, A, C.....Minneapolis
Lynch, M. J.....Minneapolis
Lyng, John.....Minneapolis
Lysne, Henry.....Minneapolis
McCarthy, Donald....Minneapolis
McCartney, Jas. S....Minneapolis
McDaniel, Oriana.....Minneapolis
McDermott, T. E.....Minneapolis
McEachran, A.....Minneapolis
McFarland, Arthur H.....Minneapolis
McIntyre, George....Minneapolis
McKinley, C. A.....Minneapolis
McKinley, J. C.....Minneapolis
McKinney, F. S.....Minneapolis
McLaughlin, Jas. A...Minneapolis
McPheeters, H. O.....Minneapolis
MacDonald, A. E.....Minneapolis
MacDonald, D. A.....Minneapolis
MacDonald, I. C.....Minneapolis
Macnie, John.....Minneapolis
Maland, C. O.....Minneapolis
Mann, A. T.....Minneapolis
Marcley, W. J.....Minneapolis
Mariette, E.....Hopkins
Mark, D. B.....Minneapolis
Matchan, Glen R.....Minneapolis
Matthews, Justus....Minneapolis
Maxeiner, Stanley R..Minneapolis
May, W. H.....Minneapolis
Mead, Marion A.....Minneapolis
Merkert, G. L.....Minneapolis
Meyer, E. L.....Minneapolis
Michael, J. C.....Minneapolis
Michelson, H. E.....Minneapolis
Moir, Wm. W.....Minneapolis
Monahan, J. A.....Minneapolis
Moorhead, M. B.....Minneapolis
Moren, Edwin.....Minneapolis
Moriarty, Cecile R...Minneapolis
Morrison, A. W.....Minneapolis
Morse, John H.....Minneapolis
Morton, H. McI.....Minneapolis
Murphy, I. J.....Minneapolis
Murray, Wm. R.....Minneapolis
Myers, J. A.....Minneapolis
Nathanson, M. H.....Minneapolis
Neal, J. M.....Minneapolis
Nelson, C. P.....Owatonna
Nelson, H. S.....Minneapolis
Nelson, O. E.....Minneapolis
Newhart, Horace.....Minneapolis
Nippert, L. A.....Minneapolis
Noonan, Dan F.....Minneapolis
Nootnagel, C. F.....Minneapolis
Noran, A. N.....Minneapolis
Nordin, G. T.....Minneapolis
Nordland, Martin.....Minneapolis
Oberg, C. M.....Minneapolis
Odland, Henry.....Minneapolis
O'Donnell, J. E.....Minneapolis
Olson, Frederick A...Minneapolis
Olson, G. M.....Minneapolis
Olson, Olaf A.....Minneapolis
Olson, R. G.....Minneapolis
Owre, Oscar.....Minneapolis
Parks, A. H.....Minneapolis
Patterson, W. E.....Minneapolis
Paulsen, E. L.....Minneapolis
Pearce, N. O.....Minneapolis
Pederson, Harold.....Minneapolis
Pederson, R. M.....Minneapolis
Peppard, T. A.....Minneapolis
Perry, Ralph St. John.....Minneapolis
Peters, R. M.....Minneapolis
Petersen, J. R.....Minneapolis
Petersen, Thorvald...Minneapolis
Peterson, O. H.....Minneapolis
Peterson, Willard C..Minneapolis

Pettit, C. W.....Minneapolis
Peyton, Wm. T.....Minneapolis
Phelps, Kenneth A...Minneapolis
Pineo, W. B.....Minneapolis
Poehler, F. T.....Minneapolis
Poppe, F. H.....Minneapolis
Pratt, Fred J.....Minneapolis
Pratt, J. A.....Minneapolis
Preine, Irving A.....Minneapolis
Prim, J. A.....Minneapolis
Proshek, C. E.....Minneapolis
Quinby, Thos. F.....Minneapolis
Quist, Henry W.....Minneapolis
Bavu, Bjarne .....Minneapolis
Reed, Charles A.....Minneapolis
Rees, S. P.....Minneapolis
Regnier, E. A.....Minneapolis
Reinertson, B. R....Buffalo, S. D.
Reynolds, J. S.....Minneapolis
Richdorf, L. F.....Minneapolis
Rishmiller, J. H.....Minneapolis
Rizer, R. I.....Minneapolis
Roan, Carl M.....Minneapolis
Robb, Edw. F.....Minneapolis
Roberts, Thos. S.....Minneapolis
Roberts, W. B.....Minneapolis
Robitshek, E. C.....Minneapolis
Rochford, W. E.....Minneapolis
Rodda, F. C.....Minneapolis
Rodgers, C. L.....Minneapolis
Rosen, S.....Minneapolis
Rosenwald, R. M.....Minneapolis
Rowe, Paul H.....Minneapolis
Sawatzky, Wm. A.....Minneapolis
Schaaf, Fred K.....Minneapolis
Schefcik, J. F.....Minneapolis
Scheldrup, N. H.....Minneapolis
Schlutz, F. W.....Minneapolis
Schmidt, Geo. F.....Minneapolis
Schmitt, Aaron F.....Minneapolis
Schmitt, S. C.....Minneapolis
Schneider, J. P.....Minneapolis
Schussler, Otto F.....Minneapolis
Schwyzer, G. .....Minneapolis
Seaberg, J. A.....Minneapolis
Seashore, Gilbert ....Minneapolis
Seham, Max .....Minneapolis
Simons, J. H.....Minneapolis
Simpson, Ellery D....Minneapolis
Simpson, J. D.....Minneapolis
Sivertsen, Andrew ...Minneapolis
Sivertsen, Ivar .....Minneapolis
Slocumb, Maude .....Minneapolis
Smith, Adam M. .....Minneapolis
Smith, A. E. .....Minneapolis
Smith, Homer R. .....Minneapolis
Smith, Norman M. ...Minneapolis
Soderlind, A. .....Minneapolis
Souba, Fred. J.....Minneapolis
Spratt, C. N.....Minneapolis
Staples, H. L.....Minneapolis
Stewart, C. A.....Minneapolis
Stomel, Joseph .....Minneapolis
Strachauer, A. C.....Minneapolis
Strout, E. S.....Minneapolis
Strout, G. Elmer.....Minneapolis
Sundt, M. .....Minneapolis
Swanson, Roy E.....Minneapolis
Sweetser, H. B.....Minneapolis
Sweetser, Theo. .....Minneapolis
Sweitzer, S. E.....Minneapolis
Taft, J. O.....Minneapolis
Taft, Walter L.....Minneapolis
Tanner, Alvin C.....Minneapolis
Taylor, Rood .....Minneapolis
Tennyson, Theo. .....Minneapolis
Thomas, D. O. .....Minneapolis
Thomas, Geo. E. ....Minneapolis
Thomas, Geo. H. ....Minneapolis
Thomas, Gilbert J....Minneapolis
Thompson, Herb. H..Minneapolis
Tingdale, A. C.....Minneapol'is
Towers, F. E.....Minneapolis
Turnacliff, D. D.....Minneapolis
Tyrrell, C. C.....Minneapolis
Ulrich, Henry L.....Minneapolis
Undine, Clyde A.....Minneapolis
Voyer, Emile O.....Minneapolis
Wanous, E. Z.....Minneapolis
Ward, A. W.....Minneapolis
Ward, Percy .....Minneapolis
Warham, T. T.....Minneapolis
Watson, C. W.....Minneapolis
Watson, J. A.....Minneapolis
Webb, R. C.....Minneapolis
Weisman, Sam .....Minneapolis
Welles, H. J.....Minneapolis
Weston, C. G.....Minneapolis
Wethall, A. G.....Minneapolis
Weum, T. W.....Minneapolis
Whetstone, Mary ....Minneapolis
White, S. Marx.....Minneapolis
White, Willard D.....Minneapolis
Widen, W. F.....Minneapolis
Wilcox, Archa E.....Minneapolis
Wilcox, M. Russell...Minneapolis
Willcutt, Clarence ...Minneapolis
Williams, Robert ....Minneapolis
Willson, Hugh S.....Minneapolis
Wittich, F. W.....Minneapolis
Wohlrabe, A. A.....Minneapolis
Wood, Douglas F.....Minneapolis
Woodard, F. R.....Minneapolis
Woodworth, Elizab...Minneapolis
Wright, C. B.....Minneapolis
Wright, C. D.....Minneapolis
Wright, F. R.....Minneapolis
Wynne, H. M. N.....Minneapolis
Yoerg, O. W.....Minneapolis
Zaworski, E. A.....Minneapolis
Zierold, A. A.....Minneapolis
Ziskin, Thos. .....Minneapolis

Wright County Medical Society

Regular meetings, first Tuesday after first Monday quarterly
Annual meeting, October

President
Roholt, C. L.....Waverly
Secretary
Catlin, John J.....Buffalo

Catlin, John J.....Buffalo
Ellison, Frank .....Monticello

Freed, O. J. R.....Cokato
Harriman, L. .....Howard Lake
Hawkins, E. P.....Montrose
Klaveness, E. .....Monticello
Lee, J. L. .....Watertown
Moffatt, A. G.....Howard Lake
Norris, G. H.....Annandale
Peterson, O. L.....Cokato

Phillips, A. E.....Delano
Ridgway, A. M.....Annandale
Roholt, C. L.....Waverly
Rousseau, Victor.....Maple Lake
Shrader, E. E.....Watertown
Sturges, C. J.....Buffalo
Thoresen, Th.....Brooklyn, N. Y.
Werner, O. S.....St. Hilaire

Meeker County Medical Society

Annual meeting, December

President
Sturre, J. H.....Watkins
Secretary
Danielson, K. A.....Litchfield

Brigham, Frank .....Watkins
Cutts, G. A. C.....Litchfield
Danielson, K. A.....Litchfield
Dulude, S. .....Dassel
O'Connor, D. C.....Eden Valley

Peterson, Alfred .....Dassel
Robertson, A. W.....Litchfield
Robertson, W. P.....Litchfield
Sturre, J. R.....Watkins

Stearns-Benton County Medical Society

Regular meetings, third Thursday in January, April, July and October
Annual meeting, third Thursday in April

President
Watson, Tolbert .....Albany
Secretary
Libert, J. N.....St. Cloud

Ausman, Carl F.....Paynesville
Beebe, W. L.....St. Cloud
Beaty, James H.....St. Cloud
Boehm, John C.....St. Cloud
Bowing, I. E.....St. Cloud
Brigham, C. F.....St. Cloud
Clark, Harry B.....St. Cloud
Du Bois, Julian A...Sauk Center
Du Bois, Julian F...Sauk Center
Freeman, W. L.....Foley
Friesleben, Wm. ....Sauk Rapids
Moynihan, And. F...Sauk Center

Gelz, J. J.....St. Cloud
Goehrs, H. W.....St. Cloud
Gulde, W. C.....St. Cloud
Haberman, E.....Osakis
Hemstead, Werner ....St. Cloud
Holdridge, G. A.....Foley
Kern, M. J.....St. Cloud
Kingsbury, E. M.....Clearwater
Kohler, D. W.....St. Joseph
Kuhlman, Aug. .....Melrose
Lewis, E. J. .....St. Cloud
Lewis, C. B. .....St. Cloud
Libert, J. N.....St. Cloud
McDowell, J. P.....St. Cloud
McKibben, H. E.....St. Cloud
Meyer, A. A.....Melrose

Pfaff, E. K.....Los Angeles
Pilon, P. C.....Paynesville
Putney, George E.....Paynesville
Rathbun, A. M.....Rice
Rathbun, C. A.....St. Cloud
Rice, G. D.....St. Cloud
Richardson, Fred S.....Belgrade
Richter, E. H.....Hunter, N. D.
Ridgeway, Alex. .....Belgrade
Sherwood, G. E.....Kimball
Stangl, Fred .....St. Cloud
Stangl, P. E. .....St. Cloud
Sutton, Chas. S.....St. Cloud
Sweetman, R. H.....Sauk Center
Watson, Tolbert .....Albany
Walner, Oscar H.....Gilbert

Kandiyohi-Swift County Medical Society

Regular meetings, quarterly, as called by the President
Annual meeting, December

President
Johnson, Hans .....Kerkhoven
Secretary
Scofield, C. L.....Benson

Anderson, R. E.....Willmar

Branton, A. F.....Willmar
Branton, B. J.....Willmar
Daignault, O. .....Benson
Davison, P. C.....Willmar
Dowswell, W. J.....Benson
Frost, E. H.....Willmar
Hodapp, J. R.....Willmar

Jacobs, Jno. C.....Willmar
Johnson, H.....Kerkhoven
Kaufman, Wm. .....Appleton
Kolset, Carl D.....Benson
Little, D. W.....Appleton
Rains, John M.....Willmar
Scofield, C. L.....Benson

FIFTH DISTRICT

COUNCILOR, H. M. WORKMAN (2 years) ..... Tracy

Camp Release District Medical Society

Renville, Chippewa, Lac Qui Parle, Yellow Medicine and Sibley Counties
Regular meetings, fourth Thursday in January, April, July and October
Annual meeting, fourth Thursday in October

President
Adams, R. C. ..... Bird Island
Secretary
Peterson, H. E. ..... Granite Falls

Adams, R. C. ..... Bird Island
Aldrich, F. H. ..... Belview
Bacon, R. S. ..... Montevideo
Barfield, J. J. ..... Granite Falls
Bergh, L. N. ..... Montevideo
Brand, W. A. ..... Redwood Falls
Burns, M. A. ..... Milan
Bushey, M. E. ..... Arlington
Clay, E. M. ..... Renville
Cole, H. B. ..... Redwood Falls
Crandall, A. M. ..... Madison
Cress, E. E. ..... Boyd
Eisengraeber, G. A. ..Granite Falls
Englehart, P. C. ..... Wood Lake
Flinn, B. P. ..... Redwood Falls
Flinn, T. E. ..... Redwood Falls
Flower, W. Z. ..... Minneapolis
Frisch, Frank P. ..... Gibbon
Gaines, E. C. ..... Buffalo Lake
Guyer, L. G. ..... Nopeming
Hauge, M. M. ..... Clarkfield
Johnson, C. M. ..... Dawson
Johnson, H. M. ..... Dawson
Lee, W. N. ..... Madison
Lima, Ludvig ..... Montevideo
Mesker, G. H. ..... Olivia
Olson, W. P. ..... Gaylord
Paser, A. A. ..... Olivia
Penhall, F. W. ..... Morton
Peterson, H. E. ..... Granite Falls
Puffer, F. L. ..... Bird Island
Sanderson, A. G. ..... Granite Falls
Sherman, H. T. ..... Franklin
Smith, L. G. ..... Montevideo
Stemsrud, A. A. ..... Dawson
Westby, N. ..... Madison
Zimbeck, R. D. ..... Maynard

Redwood-Brown County Medical Society

Annual meeting, June

President
Juergens, H. M. ..... Sanborn
Secretary
Meierding, Wm. A. ..... Springfield

Adams, J. L. ..... Morgan
Cosgriff, J. A. ..... Lamberton
Dubbe, F. H. ..... New Ulm
Eckstein, A. W. ..... Comfrey
Fritsche, A. ..... New Ulm
Fritsche, L. A. ..... New Ulm
Gray, F. D. ..... Marshall
Hammermeister, Theo. F. ..... New Ulm
Haskins, J. L. ..... Northfield
Jamieson, Earl ..... Walnut Grove
Juergens, H. M. ..... Sanborn
Kiefer, M. A. ..... Sleepy Eye
Meierding, Wm. A. ..... Springfield
Pederson, O. J. ..... Hanska
Peterson, R. A. ..... Vesta
Reinecke, George F. ..... New Ulm
Rothenburg, J. C. ..... Springfield
Schoch, J. L. ..... New Ulm
Seifert, Otto J. ..... New Ulm
Shrader, J. S. ..... Springfield
Strickler, A. F. ..... Sleepy Eye
Strickler, Mary ..... Sleepy Eye
Strickler, O. C. ..... New Ulm
Vogel, Jos. H. ..... New Ulm
Vogtel, M. A. ..... Minneapolis
Walker, C. C. ..... Raymond
Weiser, Geo. B. ..... New Ulm
Wellcome, J. W. B. ..... Sleepy Eye

Lyon-Lincoln County Medical Society

Regular meetings, first Tuesday in March, May and July
Annual meeting, October

President
Robertson, J. B. ..... Cottonwood
Secretary
Workman, H. M. ..... Tracy

Akester, Ward ..... Marshall
Bossingham, O. N. ..... Lake Benton
Engh, Sigfred ..... Cottonwood
Ford, Burton C. ..... Marshall
Germo, Chas. ..... Balaton
Hoidale, A. D. ..... Tracy
Jacobsen, David J. ..... Russell
Jacquot, G. L. ..... Tyler
Jensen, J. C. ..... Hendricks
McCoy, J. E. ..... Ivanhoe
Persons, C. E. ..... Marshall
Robertson, J. B. ..... Cottonwood
Sanderson, E. T. ..... Minneota
Thordarson, Theo. ..... Minneota
Vadheim, A. L. ..... Tyler
Valentine, W. H. ..... Tracy
Workman, H. M. ..... Tracy
Workman, W. G. ..... Tracy

SIXTH DISTRICT

COUNCILOR, F. R. WEISER (3 years) ..... Windom

Southwestern Minnesota Medical Society

Pipestone, Rock, Murray, Nobles, Cottonwood, and Jackson Counties
Regular meetings, May and October
Annual meeting, October

President
Balcom, G. G. ..... Lake Wilson
Secretary
Piper, Wm. A. ..... Mountain Lake

Arnold, E. W. ..... Adrian
Atkins, G. L. ..... Jackson
Balcom, G. G. ..... Lake Wilson
Basinger, Harvey R. ..... Mountain Lake
Bong, J. H. ..... Jasper
Brown, A. H. ..... Pipestone
Chadbourn, A. G. ..... Heron Lake
Cress, P. J. ..... Ellsworth
De Boer, Herman ..... Edgerton
Ditmeier, L. M. Gerber ..... Jasper
Dolan, C. P. ..... Worthington
Doms, H. C ..... Slayton
Doms Wm. ..... Woodstock
Dudley, J. H. ..... Windom
Golden, C. M. ..... Tyler
Halloran, Walter ..... Jackson
Hilger, J. M. ..... Iona
Hitchings, W. S. ..... Lakefield
Johnson, Ellsworth ..... Windom
Keeling, F. L. ..... Lakefield
Lowe, Thos. ..... Pipestone
McCrea, Jas. ..... Fulda
McKeown, E. G. ..... Pipestone
Manson, F. M. ..... Worthington
May, C. C. ..... Adrian
Metcalf, F. W. ..... Fulda
Mork, B. O. ..... Worthington
Nusbaum, W. H. ..Storm Lake, Ia.
Patterson, W. E. ..... Westbrook
Piper, Wm. A. ..... Mountain Lake
Portman, W. C. ..... Jackson
Richardson, W. E. ..... Pipestone
Richmond, Chas. D. ..... Jeffers
Rose, J. F. ..... Lakefield
Sherman, C. L. ..... Luverne
Slater, S. A. ..... Worthington
Smallwood, J. F. ..... Worthington
Sogge, L. ..... Windom
Stanley, C. R. ..... Worthington
Taylor, Wm. J. ..... Pipestone
Thorson, E. O. ..... Luverne
Tiedeman, E. J. ..... Adrian
Tiedeman, I. D. ..... Heron Lake
Tofte, Josephine ..... Minneapolis
Waller, Jas. D. ..... Wilmont
Watson, F. G. ..... Worthington
Weiser, F. R. ..... Windom
Williams, L. A. ..... Slayton
Wright, C. O. ..... Luverne

Blue Earth Valley Medical Society

Martin and Faribault Counties
Regular meetings, 4th Thursday, May and October
Annual meeting, May

President
Hunte, A. F.....Truman
Secretary
Hunt, R. C.....Fairmont

Bailey, H. B.....Ceylon
Best, F. E.....Wells
Broberg, J. A.....Blue Earth
Butz, J. A.....Monterey
Chambers, W. C.....Blue Earth
Cooper, M. D.....Winnebago
Dewey, G. W.....Fairmont
Gough, W. H.....Granada
Henderson, A. J.....Kiester
Holm, P. .....Wells
Herman, S. .....Welcome
Hunt, F. N.....Fairmont
Hunt, R. C.....Fairmont
Hunte, A. F.....Truman
Jacobs, A. C.....Elmore
Johnson, H. P.....Fairmont
Logan, F. W.....Blue Earth
Lowe, R. C.....Fairmont
Luedtke, G. H.....Fairmont
McGroarty, J. J.....Easton
Mills, J. W.....Winnebago City
Richardson, W. J.....Fairmont
Sybilrud, H. W.....Brice yn
Wilson, C. E.....Blue Earth

Watonwan County Medical Society

Annual meeting, December

President
Ternstrom, O. H.....Minneapolis
Secretary
Grimes, H. B.....Madelia

Bregel, F. L.....St. James
Grimes, H. B.....Madelia
Hagen, O. E.....Butterfield
Kabrick, O. A.....Odin
McCarthy, W. J.....Madelia
Ternstrom, O. H.....Minneapolis
Thompson, Albert .....St. James

SEVENTH DISTRICT

COUNCILOR, F. A. DODGE, M. D. (1 year).....Le Sueur

Nicollet-Le Sueur County Medical Society

Regular meetings, September and December
Annual meeting, December

President
Behmler, Fred. W.....Lafayette
Secretary
Le Clerc, J. E.....Le Sueur

Aitkens, H. B....Le Sueur Center
Baskett, Geo. T.....St. Peter
Baskett, Olive T.....St. Peter
Behmler, Fred W.....Lafayette
Covell, W. W.....St. Peter
Daniels, J. W.....St. Peter
Dodge, F. A.....Le Sueur
Ericson, S. .....Le Sueur
Fisher, J. M.....St. Peter
Hartung, H. A.....Le Sueur
Le Clerc, J. E.....Le Sueur
McDougald, D. W.....Minneapolis
Meilicke, W. A.....Nicollet
Phelps, R. M.....St. Peter
Smith, D. F.....St. Peter
Strathern, F. P.....St. Peter
Woodworth, L. F. Le Sueur Center

McLeod County Medical Society

Regular meetings, quarterly
Annual meeting, September

President
Schmidt, W. R.....Glencoe
Secretary
Axilrod, D. L.....Hutchinson

Axilrod, D. L.....Hutchinson
Bolles, D. W.....Long Beach, Cal.
Clair, J. B.....Winsted
Kohler, F. G.....Minneapolis
Clement, J. B.....Lester Prairie
Crowe, E. R.....Green Isle
Engstrond, O. J.....Brownton
Holm, H. H.....Glencoe
Jellison, E. R.....New Auburn
Klima, W. W.....Stewart
Langhoff, A. H.....Glencoe
Saar, W. G.....Hutchinson
Schmidt, W. R.....Glencoe
Scholpp, O. W.....Hutchinson
Sheppard, Fred .....Hutchinson
Sheppard, P. E.....Hutchinson
Trutna, Thos. .....Silver Lake

Scott-Carver Medical Society

Regular meetings, first Thursday in March, June, September and December
Annual meeting, first Thursday in December

President
Bohland, F. J. von...Belle Plaine
Secretary
Reiter, H. W.....Shakopee

Bohland, F. J. von...Belle Plaine
Buck, Fred H.....Shakopee
Fischer, H. P.....Shakopee
Fischer, P. M.....Shakopee
Henriksen, H. G.....Elko
Landenberger, John. New Prague
McKeon, James.....St. Paul
Maertz, W. F.....New Prague
Meyer, P. S.....Belle Plaine
Moloney, G. R.....Belle Plaine
Morris, F. J.....New Prague
Novak, Edw. E.....New Prague
Phillips, Wm. H.....Jordan
Reiter, H. W.....Shakopee
Schneider, H. A.....Jordan

Goodhue County Medical Society

Annual meeting, first Tuesday in January

President
Aanes, A. M.....Red Wing
Secretary
Smith, M. W.....Red Wing

Aanes, A. M.....Red Wing
Anderson, J. V.....Red Wing
Anderson, S. H.....Red Wing
Claydon, L. E.....Red Wing
Conley, Alva.....Cannon Falls
Cremer, M. H.....Red Wing
Gausemel, S. D.....Goodhue
Johnson, A. E.....Red Wing
Jones, A. W.....Red Wing
Kretschmar, K. E....Minneapolis
McGuigan, H. T.....Red Wing
Sawyer, H. P.....Red Wing
Smith, M. W.....Red Wing
Steffens, L. A.....Red Wing
Werner, N. L.....Red Wing

Rice County Medical Society

Regular meetings quarterly as called
Annual meeting, December

President
Babcock, F. M.....Northfield
Secretary
Robilliard, C. M.....Faribault

Babcock, F. M.....Northfield
Davis, F. U.....Faribault
Field, Merton .....Northfield
Haessly, S. B.....Faribault
Hanson, A. M.....Faribault
Huxley, F. R.....Faribault
Kanne, C. W.....Faribault
Lee, W. P.....Northfield
Lexa, F. J.....Lonsdale
McBroom, D. E.....Faribault
Mayland, M. L.....Faribault
Morse, W. E. H.....Morristown
Moses, Joseph, Jr.....Northfield
Plonske, C. J.....Faribault
Robilliard, C. M.....Faribault
Robilliard, W. H.....Faribault
Rumpf, C. W.....Faribault
Rumpf, W. H.....Faribault
Smith, P. A.....Faribault
Theissen, W. N.....Faribault
Traeger, C. A.....Faribault
Warren, F. S.....Faribault
Warren, J. W.....Faribault
Wilson, Warren .....Northfield

Wabasha County Medical Society

Regular meetings, annually first Thursday after first Monday in July

President
Replogle, W. H.....Wabasha
Secretary
Wilson, W. F.....Lake City

Bayley, E. H.....Lake City
Cochrane, W. J.....Lake City
Dempsey, D. P.....Kellogg
Fleischhauer, D. S.....Wabasha
French, E. A.....Plainview
Gutsell, R. S.....Zumbro Falls
Radabaugh, R. C.....Hastings
Replogle, W. H.....Wabasha
Slocumb, J. A.....Plainview
Sutton, L. F.....Mazeppa
Wilson, W. F.....Lake City

EIGHTH DISTRICT

COUNCILOR, W. F. BRAASCH, M. D. (3 years).....Rochester

Blue Earth County Medical Society

Regular meetings, last Monday in each month
Annual meeting, last Monday in December

President
Edwards, Ralph T.....Elysian
Secretary
Osborn, Lida .....Mankato

Andrews, John W.....Mankato
Andrews, Roy N. .....Mankato
Arnold, James E...Vernon Center
Benham, Edward W.....Mankato
Black, William .....Mankato
Dahl, Gerhard A.....Mankato
Denman, Austin V.....Mankato
Edwards, Ralph T.....Elysian
Franchere, Fred W..Lake Crystal
Fugina, Geo. R.....Madison Lake
Hielscher, Helen H.....Mankato
Hielscher, Julian A.....Mankato
Holbrook, John S.....Mankato
Holman, Carl J.....Mankato
James, John H.....Mankato
Kelly, Thos. C.....Mankato
Kemp, Alphonse F.....Mankato
Liedloff, Adolph G.....Mankato
Lloyd, Hiram J.....Mankato
Merrill, James E.....Amboy
Miller, Victor .....Mankato
O'Connor, Patrick H.....Amboy
Osborn, Lida .....Mankato
Pratt, Chelsea C.....Mankato
Schlesselman, George .....
Good Thunder
Schlesselman, J. T.....Mankato
Schmidt, Paul F.....Mapleton
Snell, Albert M.....Rochester
Sohmer, Alphonse E. J...Mankato
Wentworth, Albert J....Mankato
Williams, Hugh O...Lake Crystal
Williams, John.....Lake Crystal

Houston-Fillmore County Medical Society

Regular meetings, May and October
Annual meeting, October

President
Helland, G. M.....Spring Grove
Secretary
Fischer, O. F.....Houston

Anderson, Norman E....Harmony
Browning, W. E.....Caledonia
Christianson, H. W.....Wykoff
Clifton, Theo. A.....Chatfield
Collins, J. S.....Wabasha
Drake, F. A.....Lanesboro
Eby, Cyrus B.....Spring Valley
Fischer, O. F.....Houston
Helland, G. M. ....Spring Grove
Helland, J. W. ....Spring Grove
Johnson, C. H.....Spring Valley
Kibbe, O. A.....Canton
Kierland, P. E.....Alexandria
Lannin, J. C.....Mabel
Love, Geo. A.....Preston
Nannestad, R. F.....Lanesboro
Nass, H. A.....Mabel
Nelson, M. S.....Spring Grove
Onsgard, C. K.....Halstad
Onsgard, L. K.....Houston
Rhines, D. C.....Caledonia
Sather, E. R.....Alexandria
Tierney, C. M.....Granger
Utley, J. D.....Glendale, Cal.
Williams, R. V.....Rushford
Woodruff, C. W.....Chatfield

Mower County Medical Society

Regular meetings, last Thursday of every month
Annual meeting, November

President
Allen, C. C.....Austin
Secretary
Lommen, P. A.....Austin

Allen, A. W.....Austin
Allen, C. C.....Austin
Cobb, Willis F.....Lyle
Coleman, F. B.....Austin
Grise, W. B.....Austin
Hegge, C. A. .....Austin
Hegge, O. H. .....Austin
Henslin, A. E.....LeRoy
Hertel, G. E.....Austin
Leck, C. C.....Austin
Lommen, P. A.....Austin
Melzer, G. R.....Lyle
Morris, E. H.....Austin
Morse, M. P.....LeRoy
Schottler, G. J.....Dexter
Shipley, H. M.....Adams
Torkelson, P. T.....Lyle
Warren, C. L.....LeRoy

Dodge County Medical Society

No regular meetings
Annual meeting in August

President
Harrison, E. E.....West Concord
Secretary
Bigelow, C. E.....Dodge Center

Adams, R. T.....Mantorville
Baker, Amos L.....Kasson
Belt, Wallace E....Dodge Center
Bigelow, Chas. E...Dodge Center
Clifford, Frank F...West Concord
Flores, O. T.....Dodge Center
Harrison, Elmer E.West Concord
Smith, Frank D.....Kasson
Way, Osman F.....Claremont

Olmsted County Medical Society

Regular meetings, second Wednesday in April, June, September and December
Annual meeting, second Wednesday in December

President
Sistrunk, W. E.....Rochester
Secretary
Piper, M. C.....Rochester

Abrams, W. D.....Rochester
Adams, S. Franklin....Rochester
Adson, Alfred W.....Rochester
Allen, Wilson A.....Rochester
Amberg, Samuel .....Rochester
Anderson, C. M.....Rochester
Anderson, John G.....Rochester
Asbury, Elsie .....Rochester
Asbury, J. T.....Rochester
Balfour, Donald C.....Rochester
Barborka, C. J.....Rochester
Bargen, J. Arnold.....Rochester
Barnes, A. R.....Rochester
Barrier, Chas. W.....Rochester
Becker, Samuel Wm....Rochester
Behn, Claud W.....Rochester
Benedict, William L....Rochester
Benjamin, W. G.....Rochester
Bergen, Ralph D.....Rochester
Berkman, David M.....Rochester
Bleifus, Walter F.....Rochester
Bliss, John Herbert....Rochester
Bonta, M. B.....Rochester
Boothby, Walter M.....Rochester
Bothe, Fred A.....Rochester
Bowing, Harry H.....Rochester
Bowler, John Pollard..Rochester
Braasch, William F....Rochester
Broders, Albert C.....Rochester
Brown, George E. ....Rochester
Brown, P. W. .....Rochester
Brown, R. O. .....Rochester
Bryan, A. W.....Rochester
Bucerman, Winifred Henry....
Rochester
Buie, L. A.....Rochester
Bumpus, Herman C.....Rochester
Burden, Verne G.....Rochester
Burns, J. G.....Rochester
Camp, John Dexter.....Rochester
Carman, Russell Daniel.Rochester
Cathcart, E. P.....Rochester
Chaney, W. C.....Rochester
Cobb, Donnell B.....Rochester
Collins, Harry A.....Rochester
Comfort, M. W.....Rochester
Conner, H. M.....Rochester
Craig, Wm. McK.....Rochester
Crane, W. W., Jr.....Rochester
Crawford, Albert S.....Rochester
Crenshaw, John L.....Rochester
Crewe, John E.....Rochester
Culligan, J. M.....Rochester
Culligan, L. C.....Rochester
Daly, Joseph .....Rochester
Davis, A. C.....Rochester
Davis, Kenneth S.....Rochester
Delamere, G. D.....Rochester
Desjardines, Arthur U..Rochester
Dixon, C. F.....Rochester
Dixon, R. K.....Rochester
Dobson, Herbert Victor.Rochester
Dolder, Felix C.....Eyota
Drips, D. G.....Rochester
Dunlap, H. F.....Rochester
Eager, B. F.....Rochester
Ebert, Joseph William.Rochester
Espenlaub, G. H.....Rochester
Eusterman, Geo. B.....Rochester
Evarts, Arrah B.....Rochester
Faust, L. S.....Rochester
Fawcett, Chas. E.....Stewartville
Figi, F. A.....Rochester
Finney, W. P.....Rochester
Ford, Frances A.....Rochester
Forsberg, Carl Wm....Rochester
Foucar, H. O.....Rochester
Fowler, L. H.....Rochester
Freed, C. F.....Rochester
Gaarde, Fred W.....Rochester
Garvin, John Day.....Rochester
Giffin, H. Z.....Rochester
Gilliam, R. M.....Rochester
Gipner, J. F.....Rochester
Goeckerman, W. H....Rochester
Granger, Charles T.....Rochester
Green, Carl Hartley....Rochester
Hager, B. H.....Rochester
Haines, S. F.....Rochester
Hallberg, C. A.....Rochester
Hallenbeck, Dorr F.....Rochester
Hanson, W. Arthur....Rochester
Harding, D. B.....Rochester
Harrington, S. W.....Rochester
Hartman, Howard R...Rochester
Hauser, E. D. W.....Rochester
Hedblom, Carl A.....Rochester
Helmholz, H. F.....Rochester
Hempstead, B. E.....Rochester
Hench, Philip S.....Rochester
Henderson, Melvin S....Rochester
Hendricks, Wm. A.....Rochester
Herbst, William P.....Rochester
Heyerdale, Oscar C.....Rochester
Holloway, J. K.....Rochester
Houck, K. H.....Rochester
Huffman, L. D.....Rochester
Hunt, Verne C.....Rochester
Hyer, C. A.....Rochester
Jepson, P. N.....Rochester
Johnson, A. C.....Rochester
Jones, H. T.....Rochester
Joyce, George T.....Rochester
Judd, Edward Starr....Rochester
Keiser, V. D.....Rochester
Keith, N. M.....Rochester
Kennedy, Roger L. J...Rochester
Kent, George B.....Rochester
Kernohan, J. W.....Rochester
Kilbourne, Arthur F....Rochester
Kilfoy, E. J.....Rochester
Kilgore, Allen M.....Rochester
Kilgore, F. H.....Rochester
Knight, Mary S.....Rochester
Koucky, J. D.....Rochester
Larson, E. Eric.....Rochester
Latchford, J. K.....Rochester
Leech, Chas. Hoyt.....Rochester
Lemon, Willis S.....Rochester
Lillie, Harold I.....Rochester
Lillie, Walter I.....Rochester
Linton, William B.....Rochester
Logan, Archibald H....Rochester
Long, W. H.....Rochester
Luden, Georgine .....Rochester
Lyday, R. O.....Rochester
Lyons, Shirley C.....Rochester
McGuire, L. D.....Rochester
McKaig, Carle B.....Rochester
McVicar, Chas. S.....Rochester
Magath, T. B.....Rochester
Mahle, A. E.....Rochester
Mailer, Robert .....Rochester
Malloy, J. F.....Rochester
Marsh, Fred Eugene...Rochester
Marquis, W. James....Rochester
Masson, D. M.....Rochester
Masson, James C.....Rochester
Mayfield, A. L.....Rochester
Mayo, Charles H. .....Rochester
Mayo, William J. .....Rochester
Maytum, C. K.....Rochester
Mebane, Donald Cummins.....
Rochester
Meeker, W. R.....Rochester
Melson, Oliver C.....Rochester
Mentzer, S. H.....Rochester
Merrill, U. H.....Rochester
Meyerding, Henry W...Rochester
Moersch, Frederick P...Rochester
Moersch, H. J.....Rochester
Moore, Alex. B.....Rochester
Moran, Robert E.....Rochester
Morse, Harry D.....Rochester
Muhme, N. B.....Rochester
Murphy, A. B.....Rochester
Mussey, Robert B.....Rochester
Nagel, G. W.....Rochester
Nelson, Marque O.....Rochester
Nesbit, Harold T.....Rochester
New, Gordon B.....Rochester
Nixon, S. H.....Rochester
Offutt, Susan R.....Rochester
Ohlinger, Lorin B.....Rochester
O'Leary, Paul A.....Rochester
Parker, B. R. .....Rochester
Parker, H. L. .....Rochester
Parker, J. William ....Rochester
Pemberton, John deJ...Rochester
Peterman, M. G.....Rochester
Piper, Monte C.....Rochester
Plankers, A. G.....Rochester
Plummer, H. S.....Rochester
Plummer, W. A.....Rochester
Pollock, Lee W.....Rochester
Potter, J. C.....Rochester
Powell, L. D.....Rochester
Prangen, Avery D.....Rochester
Proctor, O. S.....Rochester
Pulford, DeLos Schuyler (Jr.)..
Rochester
Reid, J. Spruce.....Rochester
Rivers, A. B.....Rochester
Robertson, H. E.....Rochester
Rockwood, Paul Reed..Rochester
Rohwer, C. J.....Rochester
Rosenow, Edward C....Rochester
Rowntree, L. G.....Rochester
Sanford, Arthur H.....Rochester
Sargeant, Howard L....Rochester
Schmitt, E. O. G.....Rochester
Scholl, A. J.....Rochester
Seed, Lindon .....Rochester
Shaffer, Loren W.....Rochester
Sheldon, Walter D.....Rochester
Sistrunk, Walter E.....Rochester
Smith, F. L.....Rochester
Sprunt, William H.....Rochester
Stacy, Leda June.....Rochester
Stark, W. B.....Rochester
Steven, George .....Byron
Stevens, J. B.....Rochester
Stinson, J. W.....Rochester
Stokes, John H.....Rochester
Sutherland, C. G.....Rochester
Swan, Theo. S.....Rochester
Taylor, R. V.....Rochester
Vinson, Porter P.....Rochester
Von Lackum, W. H.....Rochester
Wagener, H. P.....Rochester
Wahle, Geo. H.....Rochester
Walters, H. W.....Rochester
Wangensteen, Owen H..Rochester
Webber, I. M.....Rochester
Weir, J. F.....Rochester
Wilder, Russell M.....Rochester
Wilhelm, L. F. X.....Rochester
Wilkins, J. A.....Rochester
Williamson, Carl S.....Rochester
Willius, Frederick A...Rochester
Wilson, Louis B.....Rochester
Witherstine, H. H.....Rochester
Woltman, Henry W. F..Rochester
Yoakem, H. H.....Rochester

Waseca County Medical Society

Annual meeting, December

President
Miller, H. A.....Waseca
Secretary
Gallagher, B. J.....Waseca

Blanchard, H. G.....Waseca
Brandenburg, F. D...Crystal Bay
Chamberlin, W. A.....Waseca
Cory, W. M.....Waterville
Gallagher, B. J.....Waseca
Hagen, H. O.....New Richland
Joyce, T. M.....Janesville
Leopard, B. A.....New Richland
Lynn, J. F.....Waseca
McIntire, H. M.....Waseca
Miller, H. A.....Waseca
O'Hara, J. J.....Janesville
Swartwood, F. A.....Waseca

Winona County Medical Society

Regular meetings, first Tuesday in January, April, July, October
Annual meeting in January

President
Schaefer, S. .....Winona
Secretary
Robbins, C. P.....Winona

Adler, S. W.....Winona
Baer, H. C.....St. Charles
Benoit, F. T.....Winona
Clay, F. H.....St. Charles
Heise, W. F. C.....Winona
Keyes, E. D.....Winona
Leicht, O. .....Winona
Lichtenstein, H. .....Winona
Lindsay, W. V.....Winona
McLaughlin, E. M.....Winona
Nauth, W. H.....Winona
Neumann, C. A.....Lewiston
Pritchard, D. B.....Winona
Risser, E. D.....Winona
Robbins, C. P.....Winona
Rosenberry, B. P.....Winona
Schaefer, S. .....Winona
Scott, J. N.....St. Charles
Steiner, I. W.....Winona
Tweedy, G. J.....Winona

Freeborn County Medical Society

Regular meetings upon call of members
Annual meeting, November

President
Von Berg, J. P.....Albert Lea
Secretary
Folken, F. G.....Albert Lea

Burns, H. D.....Albert Lea
Butturff, C. R.....Freeborn
Calhoun, F. W.....Albert Lea
Folken, F. G. .....Albert Lea
Freeman, J. R.....Glenville
Gamble, J. W.....Albert Lea
Gullixson, A. .....Albert Lea
Kamp, B. A.....Albert Lea
King, W. L.....Albert Lea
Nannestad, J. R.....Albert Lea
Odegaard, B. O.....Emmons
Palmer, C. F.....Albert Lea
Palmer, W. L.....Albert Lea
Shultz, J. A.....Albert Lea
Vollum, E. O.....Albert Lea
Von Berg, J. P.....Albert Lea

Steele County Medical Society

Regular meetings, second alternate Tuesday of each month
Annual meeting, December

President
Smersh, J. F.....Owatonna
Secretary
Hart, A. B.....Owatonna

Andrist, J. W.....Owatonna
Gamble, R. M.....Ellendale
Hart, A. B.....Owatonna
McIntyre, J. A.....Owatonna
Melby, B. .....Blooming Prairie
Peterson, C. .....Owatonna
Quigley, T. C.....Owatonna
Senn, E. W.....Owatonna
Smersh, F. M. .....Owatonna
Smersh, J. F. .....Owatonna
Stewart, A. B.....Owatonna

ALPHABETICAL ROSTER

Aanes, A. M.....Red Wing
Abbott, A. W.....Minneapolis
Abbott, J. S.....St. Paul
Abbott, Wm. P.....Duluth
Aborn, W. H.....Hawley
Abramovich, J. H.....St. Paul
Abrams, W. D.....Rochester
Adair, F. L.....Minneapolis
Adams, B. S.....Hibbing
Adams, J. L.....Morgan
Adams, R. C.....Bird Island
Adams, Rollin T.....Mantorville
Adams, S. Franklin....Rochester
Adkins, C. M.....Grygla
Adler, S. W.....Winona
Adson, A. W.....Rochester
Agnew, Allen T.....
International Falls
Ahrens, A. E.....St. Paul
Ahrens, A. H.....St. Paul
Aitkens, H. B....Le Sueur Center
Akester, Ward .....Marshall
Alden, J. F. .....St. Paul
Aldes, Harry .....St. Paul
Aldrich, F. H.....Belview
Alexander, F. H.....St. Paul
Aling, C. P.....Minneapolis
Allen, A. W.....Austin
Allen, C. C.....Austin
Allen, F. A.....Crosby
Allen, F. H.....Staples
Allen, H. W.....Minneapolis
Allen, Mason .....St. Paul
Allen, W. A.....Rochester
Allison, R. G.....Minneapolis
Amberg, Samuel .....Rochester
Anderson, A. E.....Minneapolis
Anderson, A. G.....Minneapolis
Anderson, C. M.....Rochester
Anderson, David D...Minneapolis
Anderson, Edward D..Minneapolis
Anderson, Hilding C.....Duluth
Anderson, John G.....Rochester
Anderson, J. K.....Deerwood
Anderson, J. V.....Red Wing
Anderson, Norman E....Harmony
Anderson, R. E.....Willmar
Anderson, S. H.....Red Wing
Anderson, W. T.....St. Paul
Andrist, J. W.....Owatonna
Annis, H. B.....Minneapolis
Archibald, Frank M...Mahnomen
Arends, A. L.....St. Paul
Arey, H. C.....Excelsior
Arminem, K. V.....Duluth
Armstrong, E. L.....Duluth
Armstrong, J. M.....St. Paul
Arnold, E. W.....Adrian
Arnold, James E...Vernon Center
Arnquist, A. S.....St. Paul
Arnson, J. M.....Graceville
Arouni, Khalil.....St. Paul
Arvidson, C. G.....Minneapolis
Arzt, C. P.....St. Paul
Asbury, Eslie.....Rochester
Asbury, J. T.....Rochester
Athens, A. S.....Buhl
Atkins, G. L. .....Jackson
Aune, Martin.....Minneapolis
Aurand, W. H.....Minneapolis
Aurness, P. A.....Minneapolis
Ausman, C. F.....Paynesville
Avery, J. Fowler.....Minneapolis
Axilrod, D. L.....Hutchinson
Aylmer, A. L.....Minneapolis
Ayres, G. T.....Ely
Babcock, F. M.....Northfield
Bacon, Donald K.....St. Paul
Bacon, Knox .....St. Paul
Bacon, L. C.....St. Paul
Bacon, R. S.....Montevideo
Badeaux, G. I.....Brainerd
Baer, H. C.....St. Charles
Bagley, W. R.....Duluth
Baier, Florence C.....Minneapolis
Bailey, H. B.....Ceylon
Baker, A. C.....Fergus Falls
Baker, A. L.....Kasson
Baker, Alfred T.....Minneapolis
Baker, E. L.....Minneapolis
Baker, Looe .....Minneapolis
Bakke, O. H.....Minneapolis
Balcom, G. G.....Lake Wilson
Balcome, F. E.....St. Paul
Baldwin, L. B.....Minneapolis
Balfour, D. C.....Rochester
Ball, C. R.....St. Paul
Bank Harry E.....Minneapolis
Barber, J. P.....Minneapolis
Barborka, C. J.....Rochester
Barden, Norman.....Minneapolis
Barfield, J. J.....Granite Falls
Bargen, J. Arnold.....Rochester
Barnes, A. R.....Rochester
Barney, L. A. .....Duluth
Barrett, Fred.....Gilbert
Barrier, Chas. W.....Rochester
Barron, Moses.....Minneapolis
Barry, L. W.....St. Paul
Barsness, Nellie.....St. Paul
Basinger, Harvey L.....
Mountain Lake
Baskett, Geo. T.....St. Peter
Baskett, Olive T.....St. Peter
Bass, G. W.....Minneapolis
Bates, B. V.....Wheaton
Baxter, S. H.....Minneapolis
Bayley, E. H.....Lake City
Beadie, W. D.....Cannon Falls
Beals, Hugh.....St. Paul
Beard, Archie H.....Minneapolis
Beaty, J. H.....St. Cloud
Beaudoux, Henry A...Minneapolis
Becker, S. W.....Rochester
Beckley, F. L.....St. Paul
Bedford, E. W.....Minneapolis
Beebe, W. L.....St. Cloud
Behmler, Fred W.....Lafayette
Behn, Claud W.....Rochester
Beise, R. A.....Brainerd
Bell, C. C.....St. Paul
Bell, J. W.....Minneapolis
Bell, J. W., Jr.....Minneapolis
Belt, W. E.....Dodge Center
Benedict, E. E.....Minneapolis
Benedict, W. L.....Rochester
Benepe, L. M.....St. Paul
Benham, E. W.....Mankato
Benjamin, A. E.....Minneapolis
Benjamin, W. G.....Rochester
Benn, F. G.....Minneapolis
Bennion, P. H.....St. Paul
Benoit, F. T.....Winona
Benson, R. D.....Minneapolis
Bentley, Norman P.....St. Paul
Berdez, G L.....Duluth
Bergen, Otto.....Clinton
Bergen, Ralph D.....Rochester
Bergh, L. N.....Montevideo
Bergheim, M. C.....Hawley
Berquist, K. E.....Duluth
Berkman, D. M.....Rochester
Berrisford, Paul D.....St. Paul
Bertelson, O. L.....Crookston
Bessesen, A. N.....Minneapolis
Bessesen, Al. N., Jr..Minneapolis
Bessesen, Daniel H...Minneapolis
Bessesen, W. A.....Minneapolis
Best, F. E.....Wells
Bigelow, C. E.....Dodge Center
Binet, H. E.....Grand Rapids
Binger, H. E.....St. Paul
Birnberg, T. L.....St. Paul
Bishop, Chas. W.....Minneapolis
Bissell, F. S.....Minneapolis
Black, William.....Mankato
Blacklock, S. S.....Hibbing
Blake, James.....Hopkins
Blakely, C. C.....Barnum
Blanchard, H. G.....Waseca
Bleifuss, W. F.....Rochester
Bliss, John H.....Rochester
Bock, R. A.....St. Paul
Bockman, M. W. H...Minneapolis
Boeckmann, Eduard.....St. Paul
Boeckmann, Egil.....St. Paul
Boehm, J. C.....St. Cloud
Bohland, E. H.....St. Paul
Bohland, F. J. von....Belleplaine
Bohling, B. S.....Sandstone
Bole, R. S.....St. Paul
Boleyn, E. S.....Stillwater
Boiles, D. W...Long Beach, Calif.
Bolsta, Chas.....Ortonville
Bolstad, H. C.....St. Paul
Boman, P. G.....Duluth
Bone, Merle.....Kelliher
Bong, J. H.....Jasper
Bonta, M. B.....Rochester
Booth, A. E.....Minneapolis
Boothby, W. M.....Rochester
Boquist, E. T. W.....Minneapolis
Boreen, C. A.....Minneapolis
Bossert, C. S.....Rochester
Bossingham, O. N....Lake Benton
Bosworth, Robinson.....St. Paul
Bothe, F. A.....St. Paul
Bottolfson, B. T.....Moorhead
Bouman, H. A.....Minneapolis
Bowen, R. L.....Hibbing
Bowing, H. H.....Rochester
Bowing I. E.....St. Cloud
Bowler, John Pollard..Rochester
Boyer, S. H.....Duluth
Boysen, P.....Pelican Rapids
Braasch, Wm. F.....Rochester
Brabec, F. J.....Perham
Bracken, H. M.....New York City
Braden, A. J.....Duluth
Bradley, E. L.....Duluth
Brand, G. D.....St. Paul
Brand, W. A.....Redwood Falls
Brandenburg, F. D...Crystal Bay
Branton, A. F.....Willmar
Branton, B. J.....Willmar
Bratrud, A. F.....Minneapolis
Bratrud O. E.....Warren
Bratrud, Theo.....Warren
Bray, C. W.....Blawabik
Bray, E. R.....St. Paul
Bregel, F. L.....St. James
Brigham, C. F.....St. Cloud
Brigham, Frank.....Watkins
Briggs, F. W.....Duluth
Brimhall, J. B.....St. Paul
Broberg, J. A.....Blue Earth
Broders, A. C.....Rochester
Brodie, Walter D.....St. Paul
Broker, W. S.....Batle Lake
Brooks, Chas. N.....Minneapolis
Brooks, D. F.....St. Paul
Brooks, G. F.....St. Paul
Brown, A. E.....Stillwater
Brown, A. H.....Pipestone
Brown, Edgar D.....Minneapolis
Brown, Ed. I.....St. Paul
Brown, Edw. J.....Minneapolis
Brown, G. E.....Rochester
Brown, John C.....St. Paul
Brown, LeRoy .....St. Paul
Brown, P. W.....Rochester
Brown, R. O.....Rochester
Brown, R. S.....Minneapolis
Browning, W. E.....Caledonia
Brunkow, C. W.....Minneapolis
Bryan, A. W.....Rochester
Buck, Fred H.....Shakopee
Bueerman, W. H.....Rochester
Buie, L. A.....Rochester
Bulkley, Kenneth....Minneapolis
Bullen, F. W.....Hibbing
Bumpus, H. C.....Rochester
Burch, F. E.....St. Paul
Burden, Verne G.....Rochester
Burfiend, G. H.....St. Paul
Burnap, W. L.....Fergus Falls
Burns, F. W.....St. Paul
Burns, H. D. .....Albert Lea
Burns, H. J.....Duluth
Burns, J. G.....Rochester
Burns, M. A.....Milan
Burns, R. L.....Two Harbors
Burns, R. M.....St. Paul
Buscher, H. .....St. Paul
Bushey, M. E.....Arlington
Butler, John .....Minneapolis
Butler, A. J.....Hackensack
Butturff, C. R.....Freeborn
Butz, J. A.....Monterey
Byrnes, W. J.....Minneapolis
Cabot, V. S.....Minneapolis
Caine, A. T.....Anoka
Caine, C. E.....Morris
Caldwell, K. S.....St. Paul
Caley, G. R.....Princeton
Calhoun, F. W.....Albert Lea
Calkins, L. A.....Minneapolis
Cameron, Angus L....Minneapolis
Cameron, J. A.....St. Paul
Camp, John Dexter....Rochester
Camp, W. E.....Minneapolis
Campbell, D. R. .....Bagley
Campbell, J. E. ....South St. Paul
Campbell, L. M.....Minneapolis
Campbell, Robert ...Minneapolis
Cannon, Harry .....St. Paul
Cantwell, W. F...Internat'l Falls
Carey, James B.....Minneapolis
Carlaw, C. M.....Minneapolis
Carman, C. L.....St. Paul
Carman, Paul I.....St. Paul

Carman, Russell D.....Rochester
Carroll, Wm. C.....St. Paul
Carstens, C. F.....Hibbing
Cathcart, E. P.....Rochester
Catlin, John J.....Buffalo
Catlin, T. J.....Palisade
Cavanaugh, J. O.....St. Paul
Chadbourn, A. G.....Heron Lake
Chamberlin, W. A.....Waseca
Chambers, W. C.....Blue Earth
Chandler, O. B.....St. Paul
Chaney, W. C.....Rochester
Chapman, T. L.....Duluth
Chatterton, C. C.....St. Paul
Cheleen, S. J.....Minneapolis
Cheney, E. L.....Duluth
Christensen, E. P....Two Harbors
Christiansen, A. .....St. Paul
Christianson, H. W.....Wykoff
Christie, G. R.....Long Prairie
Christie, R. L.....Long Prairie
Christison, J. T.....St. Paul
Cirkler, A. A.....Minneapolis
Clair, J. B.....Winsted
Clark, F. F. .....Duluth
Clark, H. B. .....St. Cloud
Clark, H. S. .....Minneapolis
Clark, T. C. .....Minneapolis
Clay, E. M.....Renville
Clay, F. H.....St. Charles
Claydon, L. E.....Red Wing
Clement, J. B.....Lester Prairie
Clifford, F. F.....West Concord
Clifton, Theo. .....Chatfield
Cobb, Donnell B.....Rochester
Cobb, S. G.....St. Paul
Cobb, Willis F.....Lyle
Cochrane, W. J.....Lake City
Colby, Woodard .....St. Paul
Cole, H. B.....Redwood Falls
Cole, Wallace H.....St. Paul
Coleman, F. B.....Austin
Collie, H. G.....St. Paul
Collins, A. N.....Duluth
Collins, Harry A.....Rochester
Collins, H. C.....Duluth
Collins, J. S.....Wabasha
Colvin, A. R.....St. Paul
Comfort, M. W.....Rochester
Comstock, A. E.....St. Paul
Condit, W. H.....Minneapolis
Conley, Alva A.....Cannon Falls
Conner, H. M.....Rochester
Conner, Wm. H.....St. Paul
Connor, C. E.....St. Paul
Cook, Henry Wireman.....
Minneapolis
Cook, Paul B.....St. Paul
Cooney, H. C.....Princeton
Cooper, M. D.....Winnebago City
Corbett, J. Frank....Minneapolis
Corrigan, J. E.....Spooner
Cory, W. M.....Waterville
Cosgriff, J. A.....Lamberton
Cosgrove, J. H.....Duluth
Cosman, E. O.....Minneapolis
Countryman. Roger S.....St. Paul
Courtney, Walter .....Brainerd
Covell, W. W.....St. Peter
Coventry, W. A.....Duluth
Cowern, E. W.....North St. Paul
Cowing, P. G.....Evansville
Crafts, Leo M.....Minneapolis
Craig, C. C.....Internat'l Falls
Craig, Wm. McK.....Rochester
Crandall, A. M.....Madison
Crandall, Wm. .....Graceville
Crane, Wm. W., Jr.....Rochester
Cranmer, Richard R..Minneapolis
Crawford, Albert S.....Rochester
Cremer, M. H.....Red Wing
Crenshaw, J. L.....Rochester
Cress, E. E.....Boyd
Cress, P. J.....Ellsworth
Crewe, J. E.....Rochester
Cross, J. G.....Minneapolis
Crowe, E. R.....Green Isle
Crowe, J. H.....Virginia
Crowl, Verne C.....Bertha
Crume, Geo. P.....Minneapolis
Culligan, J. M.....Rochester
Culligan, Leo C.....Rochester
Curtin, John F.....Minneapolis
Cutts, G. A. C.....Litchfield
Cutts, George .....Minneapolis
Cyr. A. .....Barnesville
Dack, Lloyd G.....St. Paul
Dahl. Elmer O.....Minneapolis
Dahl, G. A.....Mankato
Dahl. John A.....Minneapolis
Daignault, O. .....Benson
Daly, Joseph .....Rochester
Daniel, Donald H.....Minneapolis
Daniels, H. A.....Eveleth
Daniels, J. W.....St. Paul
Daniels, W. H.....Crookston
Danielson, K. A.....Litchfield
Darling, J. B.....St. Paul
Darrow, D. C.....Moorhead
Dart, Leslie O.....Minneapolis
Daugherty, E. B.....St. Paul
Daugherty, L. E.....St. Paul
Davis, A. C.....Rochester
Davis, B. F.....Duluth
Davis, F. U.....Faribault
Davis, Herbert .....St. Paul
Davis, H. S.....Duluth
Davis, Kenneth S.....Rochester
Davis, Lloyd T.....Wadena
Davis, T. C.....Wadena
Davis, William .....St. Paul
Davison, P. C.....Willmar
DeBoer, Hermann .....Edgerton
Dedolph, Karl .....St. Paul
Delamere, G. D.....Rochester
Delmore, J. L.....Roseau
Dempsey, D. P.....Kellogg
Denman, A. V.....Mankato
Derauf, B. I.....Brainerd
Desjardins, Arthur U...Rochester
Dewey, G. W.....Fairmont
Dezell, Earl R.....Minneapolis
Deziel, G. .....Minneapolis
Dickson, Thos. H., Jr.....St. Paul
Diehl, H. S.....Minneapolis
Disen, C. F.....Minneapolis
Ditmeier, L. M. Gerber.....Jasper
Dittman, Geo. C.....St. Paul
Dixon, Claude F.....Rochester
Dixon, J. F.....Carlton
Dixon, R. K.....Rochester
Dobson, H. V.....Rochester
Doctor, Wm. R.....Minneapolis
Dodge, F. A.....Le Sueur
Dohm, A. J.....St. Paul
Dolan, C. P.....Worthington
Dolder, F. C.....Eyota
Doms, H. C.....Slayton
Doms, Wm. .....Woodstock
Donaldson, C. A.....Minneapolis
Donohue, P. F.....St. Paul
Doolittle, L. E.....Duluth
Dorge, Richard I.....Minneapolis
Dornblaser. H. Bright.....
Minneapolis
Douglas, H. E.....Blackduck
Douglass, J. E..State Sanatorium
Dowswell, W. J.....Benson
Doxey, G. L.....Minneapolis
Doyle, Geo. C.....Duluth
Drake, Carl B.....St. Paul
Drake, C. R.....Minneapolis
Drake, F. A.....Lanesboro
Dredge, H. P.....Sandstone
Drenning, F. C.....Duluth
Driesbach, N. .....Minneapolis
Drips, D. G.....Rochester
Drought, W. W.....Fergus Falls
Dryden, F. M.....Crookston
Dubbe, F. H.....New Ulm
DuBois, J. A.....Sauk Center
DuBois, J. F.....Sauk Center
Dudley, J. H.....Windom
Dulude, S. .....Dassel
Dumas, Alexander ...Minneapolis
Dunlap, H. F.....Rochester
Dunlop, A. H.....Crookston
Dunn, Geo. Robt.....Minneapolis
Dunn, J. N.....St. Paul
Dunn, Louis .....Minneapolis
Dunsmoor, F. A.....Minneapolis
Durgin, F. L.....Nopeming
Dutton, C. E.....Minneapolis
Eager, B. F.....Rochester
Earl, George A.....St. Paul
Earl, Robert O.....St. Paul
Eberlin, E. A.....Glenwood
Ebert, Joseph William..Rochester
Eby, C. B.....Spring Valley
Eckman, P. F.....Duluth
Eckstein, A. W.....Comfrey
Edlund, G. .....St. Paul
Edwards, Ralph T.....Elysian
Egilsrud, K. .....Minneapolis
Ehmke, Wm. E.....Willow River
Ehrenberg, C. J.....Minneapolis
Eisengraeber, G. A.....
Granite Falls
Eisenman, W. G.....Chisholm
Eisler, Edw. R.....Minneapolis
Eitel, G. G.....Minneapolis
Ekblad, J. W.....Duluth
Eklund, Wm. J.....Duluth
Elias, F. J.....Duluth
Ellison, David E.....Minneapolis
Ellison, Frank E.....Monticello
Elsey, J. R.....Glenwood
Ely, O. S.....South St. Paul
Engberg, E. J.....St. Paul
Engelhart, P. C.....Wood Lake
Engh, Sigfred .....Cottonwood
Engstrond, A. J.....Brownton
Eppard, R. M.....Cloquet
Erb, F. A.....Minneapolis
Ericson, J. G.....Minneapolis
Ericson, Swan .....Le Sueur
Ernest, G. C.....St. Paul
Eshelby, E. C.....St. Paul
Espenlaub, G. H.....Rochester
Esser, John .....Perham
Estrem, C. O.....Fergus Falls
Estrem, T. A.....Hibbing
Eusterman, G. B.....Rochester
Evarts, Arrah B.....Rochester
Everlof, J. L.....Minneapolis
Evert, J. A.....St. Paul
Ewens, H. B.....Virginia
Ewing, C. F.....Wheaton
Fahey, E. W.....St. Paul
Fansler, W. A.....Minneapolis
Farr, R. E.....Minneapolis
Faust, L. S.....Rochester
Fawcett, C. E.....Stewartville
Feidt, W. W.....Minneapolis
Ferguson, J. C.....St. Paul
Ferreira, G. J.....Aurora
Fesler, Harold H.....St. Paul
Field, Merton .....Northfield
Figi, F. A.....Rochester
Finney, W. P.....Rochester
Fischer, G. .....Minneapolis
Fischer, H. P.....Shakopee
Fischer, O. F.....Houston
Fischer, P. M.....Shakopee
Fisher. J. M.....St. Peter
Fitzgerald, E. T.....Morris
Fjeldstad, C. Alford..Minneapolis
Fjellman, R. C.....Minneapolis
Flagstad, A. E.....St. Paul
Fleischhauer, D. S.....Wabasha
Fleming, A. S.....Minneapolis
Fleming, C. Filmore..Minneapolis
Fleming, James .....Cloquet
Flinn, B. P.....Redwood Falls
Flinn, T. E.....Redwood Falls
Flocken, Chas. F.....Minneapolis
Flom, A. O.....Chisago City
Flores, O. T.....Dodge Center
Flower, W. Z.....Minneapolis
Fogarty, Chas. W.....St. Paul
Foley, F. E. B.....St. Paul
Folken, F. G.....Albert Lea
Forbes, R. S.....Duluth
Ford, B. C.....Marshall
Ford, Frances A.....Rochester
Forrest, C. G.....Clearbrook
Forsberg, C. W.....Rochester
Foucar, H. O.....Rochester
Fowler, L. H.....Rochester
Fox, John M.....Minneapolis
Franchere, F. W....Lake Crystal
Franzen, H. G.....Minneapolis
Freeborn, J. A.....Fergus Falls
Freed, C. F.....Rochester
Freed, O. J. R.....Cokato
Freeman, C. D.....St. Paul
Freeman, J. P.....Glenville
Freeman, W. L.....Foley
Freligh, E. O'B.....Stillwater
French, E. A.....Plainview
Freymiller, E. F.....Cloverton
Friesleben, Wm. .....Sauk Rapids
Frisch, F. P.....Richmond
Fritsche, Albert .....New Ulm
Fritsche, L. A.....New Ulm
Froehlich, H. W.Thief River Falls
Frost, E. H.....Willmar
Fuerste, Frederick .....Proctor
Fugina, George R...Madison Lake
Fulton, J. F.....St. Paul
Furber, W. W.....Cottage Grove
Gaarde, F. W.....Rochester
Gager, E. C.....St. Paul
Gaines, E. C.....Buffalo Lake
Gallagher, B. J.....Waseca
Gamble, J. W.....Albert Lea
Gamble, R. M.....Ellendale
Gammell, J. H.....Minneapolis
Gardiner, D. G.....St. Paul
Gardner, Edwin L....Minneapolis
Gardner, R. D.....Eveleth
Garlock, A. V.....Bemidji
Garlock, D. H.....Bemidji

Garvin, John Day.....Rochester
Gates, C. E.....Anoka
Gausemel, S. D.....Goodhue
Gauthier, W. .....Virginia
Geer, Everett K.....St. Paul
Geissenger, John D.....St. Paul
Geist, Emil S.....Minneapolis
Geist, George A.....St. Paul
Gelz, J. J.....St. Cloud
Gendron, J. F.....Grand Rapids
Gerber, Milo P.....Brainerd
Germo, Chas. .....Balaton
Geyman, M. J.....Browerville
Ghent, C. Harry.....St. Paul
Ghent, M. M. .....St. Paul
Ghostley, Mary C..Internat'l Falls
Gibbon, L. L.....Lowry
Giere, E. O.....St. Paul
Giessler, Paul W.....Minneapolis
Giffin, H. Z.....Rochester
Gilbert, John D.....Carlton
Gilfillan, J. S.....St. Paul
Gilles, F. L.....Minneapolis
Gillespie, M. G.....Duluth
Gillespie, N. H.....Duluth
Gilliam, R. M.....Rochester
Gilmore, R. .....Bemidji
Ginsberg, Wm. .....St. Paul
Gipner, J. F.....Rochester
Giroux, A. A.....Duluth
Goeckerman, W. H.....Rochester
Goehrs, H. W.....St. Cloud
Golden, C. M.....Tyler
Goltz, E. V.....St. Paul
Goodheart, C. J.....Akeley
Goodman, C. E.....Virginia
Goodson, Catherine M.Retreat, Pa.
Gordon, Geo. J.....Minneapolis
Gosin, D. F.....Minneapolis
Goss, Harold .....Minneapolis
Gosslee, G. L.....Moorhead
Gotham, C. L.....St. Paul
Gough, W. H.....Granada
Graham, David .....Duluth
Graham, R. D.....Duluth
Graham, Robert .....Duluth
Granger, C. T.....Rochester
Gratzek, Thos. .....St. Paul
Grave, Floyd .....Minneapolis
Graves, Carlton .....Aitkin
Grawn, F. A.....Duluth
Gray, C. E.....Rush City
Gray, F. D.....Marshall
Greeley, L. Q.....Duluth
Green, E. K.....Minneapolis
Greene, Carl Hartley...Rochester
Greene, Charles L.....St. Paul
Griffin, P. J.....Detroit
Grimes, H. B.....Madelia
Grise, W. B.....Austin
Groll, S. .....Minneapolis
Ground, H. T.....Virginia
Grover, F. E.....Duluth
Gruenhagen, Arnold P....St. Paul
Gulde, W. C.....St. Cloud
Gullixson, A.....Albert Lea
Gunderson, Harley J..Minneapolis
Gunderson, Nels A....Minneapolis
Gunderson, R. M.....Lake Park
Gunz, A. N.....Center City
Gutsell, R. S.....Zumbro Falls
Guyer, L. G.....Nopeming

Habein, Harold C.....Minneapolis
Haberman, E. .....Osakis
Hacking, Frank H....Minneapolis
Haessley, S. B.....Faribault
Hagaman, Geo. K.....St. Paul
Hagen, G. L.....Minneapolis
Hagen, H. O.....New Richland
Hagen, O. E.....Butterfield
Hagen, O. J.....Moorhead
Hager, B. H.....Rochester
Haggard, G. D.....Minneapolis
Haight, G. G.....Audubon
Haines, J. H.....Stillwater
Haines, S. F.....Rochester
Halenbeck, P. L.....Crosby
Hall, A. E.....Virginia
Hall, A. R.....St. Paul
Hall, E. L.....Princeton
Hall, J. M.....Minneapolis
Hall, P. M.....State Sanatorium
Hallberg, C. A.....Rochester
Hallenbeck, D. F.....Rochester
Halloran, Walter .....Jackson
Hallowell, W. H.....Minneapolis
Halper, Philip .....St. Paul
Hamel, Arnold L.....Minneapolis
Hamel, C. E.....Minneapolis
Hamilton, A. S.....Minneapolis
Hamlin, Geo. B.....Minneapolis
Hammermeister, Theo. F.....
New Ulm
Hammes, E. M.....St. Paul
Hammond, J. F.....St. Paul
Hand, W. R.....Elbow Lake
Haney, C. L.....Duluth
Hannah, H. B.....Minneapolis
Hansen, Erling .....Minneapolis
Hansen, Olga S.....Minneapolis
Hanson, A. M.....Faribault
Hanson, W. Arthur.....Rochester
Harding, D. B.....Rochester
Hare, E. R.....Minneapolis
Harriman, L. .....Howard Lake
Harrington, C. D.....Minneapolis
Harrington, F. E.....Minneapolis
Harrington, S. W.....Rochester
Harris, C. N.....Nashwauk
Harrison, E. E.....West Concord
Hart, A. B.....Owatonna
Hartman, H. R.....Rochester
Hartung, H. A.....Le Sueur
Hartzell, Thos. B.....Minneapolis
Haskell, A. D.....Alexandria
Haskins, John L.....Northfield
Hastings, D. R.....Duluth
Hatch, W. E.....Duluth
Haugan, O. M.....Fergus Falls
Hauge, M. M.....Clarkfield
Haugen, G. T.....Fergus Falls
Hauser, E. D. W.....Rochester
Hauser, V. P.....St. Paul
Haverfield, Addie K...Minneapolis
Hawkins, E. P.....Montrose
Hawkins, V. J.....St. Paul
Hayes, J. M.....Minneapolis
Hayes, M. F.....Nashwauk
Head, G. D.....Minneapolis
Healy, R. T.....Pierz
Hearn, Wm. O.....Minneapolis
Heath, A. C.....St. Paul
Hedback, A. E.....Minneapolis
Hedblom, C. A.....Rochester
Hegge, C. A.....Austin
Hegge, O. H.....Austin
Heim, Russell R.....Minneapolis
Heimark, J. H.....Moorhead
Heimark, O. E.....Duluth
Heise, W. F. C.....Winona
Heik, H. H.....Minneapolis
Helland, G. M.....Spring Grove
Helland, J. W.....Spring Grove
Helmholz, H. F.....Rochester
Hempstead, B. E.....Rochester
Hemstead, Werner .....St. Cloud
Hench, Philip S.....Rochester
Henderson, A. J.....Kiester
Henderson, M. S.....Rochester
Hendricks, Wm. A.....Rochester
Hendrickson, J. F.....Minneapolis
Hengstler, W. H.....St. Paul
Henney, W. H.....McIntosh
Henriksen, H. G.....Elko
Henry, C. E.....Minneapolis
Henry, Myron O.....Minneapolis
Hensel, C. N.....St. Paul
Henslin, A. E.....LeRoy
Herbst, William P.....Rochester
Herman, S. .....Welcome
Herrmann, Edgar T.....St. Paul
Heron, Roy C.....St. Paul
Hertel, G. E.....Austin
Heseltine, Verner...Taylors Falls
Hesselgrave, S. S.....St. Paul
Heyerdale, O. C.....Rochester
Hiebert, J. P.....Minneapolis
Hicks, F. A.....Grand Marais
Hielscher, Helen H.....Mankato
Hielscher, Julian A.....Mankato
Higgins, J. H.....Minneapolis
Hilger, A. W.....St. Paul
Hilger, D. D.....St. Paul
Hilger, J. M.....Iona
Hilger, L. A.....St. Paul
Hill, Eleanor J.....Minneapolis
Hill, Frederick E.....Duluth
Hirschboeck, F. J.....Duluth
Hirschfield, Adolph...Minneapolis
Hirschfield, M. S.....Duluth
Hitchings, W. S.....Lakefield
Hoaglund, A. W.....Minneapolis
Hobbs, C. A.....Minneapolis
Hodapp, R. J.....Willmar
Hodge, S. V.....Minneapolis
Hodgson, H. H.....Crookston
Hoff, Alfred .....St. Paul
Hoff, Peder .....St. Paul
Hoffman, Max H.....St. Paul
Hoidale, A. D.....Tracy
Hoiland, A. S.....Minneapolis
Hoit, E. E.....Detroit
Holbrook, J. S.....Mankato
Holcomb, J. T.....St. Paul
Holcomb, O. W.....St. Paul
Holdridge, Geo. .....Foley
Holen, T. .....Minneapolis
Holl, P. M.....Minneapolis
Hollands, W. H.....Fisher
Holloway, J. K.....Rochester
Holloway, J. K.....Rochester
Holm, Geo. A.....Minneapolis
Holm, H. H.....Glencoe
Holm, P. F.....Wells
Holman, C. J.....Mankato
Holman, E. E.....Pine River
Holst, C. F.....Little Falls
Holst, J. B.....Little Falls
Holte, Halvor.....Crookston
Houck, K. H.....Rochester
House, Z. E.....Cass Lake
Houston, C. A.....Park Rapids
Hovde, H. .....Duluth
Howard, M. A.....St. Paul
Howard, Wm. H.....Minneapolis
Howard, W. S.....St. Paul
Huenekens, E. J.....Minneapolis
Huffman, L. D.....Rochester
Hughes, Louis D.....Minneapolis
Hullsiek, H. E.....St. Paul
Hultkrans, Joel C.....St. Paul
Humphrey, E. W.....Moorhead
Humphrey, W. R.....Stillwater
Hunt, F. N.....Fairmont
Hunt, H. E.....St. Paul
Hunt, R. C.....Fairmont
Hunt, V. C.....Rochester
Hunte, A. F.....Truman
Hursh, M. M.....Grand Rapids
Huxley, F. R.....Faribault
Hvoslef, Jakob ...Internat'l Falls
Hyer, C. A.....Rochester
Hynes, James .....Minneapolis
Hynes, John E.....Minneapolis
Ide, A. W.....St. Paul
Ikeda, Kano .....Minneapolis
Ingenson, C. A.....St. Paul
Irvine, H. G.....Minneapolis

Jacobs, A. C. .....Elmore
Jacobs, John C. .....Willmar
Jacobson, David J.....Russell
Jacquot, G. L.....Tyler
James, J. H.....Mankato
Jamieson, Earl.....Walnut Grove
Jellison, E. R.....New Auburn
Jennings, Mary H.....Minneapolis
Jensen, J. C. .....Hendricks
Jensen, Louis C. .....Minneapolis
Jensen, M. J. .....Minneapolis
Jensen, T. J. .....Duluth
Jepson, P. N. .....Rochester
Jesion, J. W.....St. Paul
Joannides, Minas ....Minneapolis
Johnson, A. C. .....Rochester
Johnson, A. E. .....Minneapolis
Johnson, A. E. .....Red Wing
Johnson, A. Elof .....Minneapolis
Johnson, Asa M. .....St. Paul
Johnson, C. H. .....Spring Valley
Johnson, C. M. .....Dawson
Johnson, Ellsworth .....Windom
Johnson, E. W. .....Bemidji
Johnson, Hans .....Kerkhoven
Johnson, Hartland C.....St. Paul
Johnson, H. M. .....Dawson
Johnson, H. P. .....Fairmont
Johnson, James A. ....Minneapolis
Johnson, Julius .....Minneapolis
Johnson, Nimrod .....Minneapolis
Johnson, Odin J.....Minneapolis
Johnson, O. V.....Sebeka
Johnson, R. A.....Minneapolis
Johnson, T. H. .....St. Paul
Johnson, Walfred .....Stillwater
Jones, A. W. .....Red Wing
Jones, E. M. .....St. Paul
Jones, G. M. .....Minneapolis
Jones, H. T. .....Rochester
Jones, H. W. .....Minneapolis
Jones, W. A. .....Minneapolis
Josewich, Alex. .....Minneapolis
Josewski, R. J.....Stillwater
Joyce, G. T.....Rochester
Joyce, T. M.....Janesville
Judd, E. S.....Rochester
Juergens, H. M.....Sanborn

Kabrick, O. A.....Odin
Kahala, A. A.....Crookston
Kalinoff, D. .....Stillwater
Kamp, B. A.....Albert Lea
Kannary, E. L.....St. Paul
Kanne, C. W.....Faribault

Karn, B. R. ..... Ortonville
Kaufman, Wm. C. ..... Appleton
Kean, N. D. ..... Coleraine
Keeling, Louis F. ..... Lakefield
Keiser, V. D. ..... Rochester
Keith, N. M. ..... Rochester
Kelly, B. W. ..... Aitkin
Kelly, John V. ..... St. Paul
Kelly, Paul H. ..... St. Paul
Kelly, Thomas C. ..... Mankato
Kelsey, C. G. ..... Hinckley
Kemp, A. F. ..... Mankato
Kennedy, C. C. ..... Minneapolis
Kennedy, Jane F. ..... Minneapolis
Kennedy, R. L. J. ..... Rochester
Kennedy, R. Ray ..... Minneapolis
Kennedy, W. A. ..... Minneapolis
Kent, George B. ..... Rochester
Kenyon, Paul ..... Wadena
Kerlan, S. Z. ..... McGregor
Kern, M. J. ..... St. Cloud
Kernohan, J. W. ..... Minneapolis
Kesting, Herman ..... St. Paul
Keyes, C. R. ..... Duluth
Keyes, E. D. ..... Winona
Kibbe, O. A. ..... Canton
Kiefer, M. A. ..... Sleepy Eye
Kierland, P. E. ..... Alexandria
Kiesling, I. H. ..... Nashwauk
Kilbourne, A. F. ..... Rochester
Kilfoy, E. J. ..... Rochester
Kilgore, A. M. ..... Rochester
Kilgore, F. H. ..... Rochester
Kimball, H. H. ..... Minneapolis
King, Walter E. ..... St. Paul
King, W. I. ..... Albert Lea
King, W. R. ..... Minneapolis
King, W. S. ..... Eveleth
Kingsbury, E. M. ..... Clearwater
Kistler, A. J. ..... Minneapolis
Kistler, A. S. ..... St. Paul
Kistler, C. M. ..... Minneapolis
Kittelson, T. N. ..... Fergus Falls
Klaveness, E. ..... Monticello
Klein, Harry ..... Duluth
Klein, H. N. ..... St. Paul
Klima, W. W. ..... Stewart
Knapp, F. N. ..... Duluth
Knauff, M. K. ..... St. Paul
Knight, H. L. ..... Minneapolis
Knight, Mary S. ..... Rochester
Knight, Ralph T. ..... Minneapolis
Knight, Ray Roberts. Minneapolis
Koch, John Charles. Minneapolis
Kohlbry, C. O. ..... Duluth
Kohler, D. W. ..... St. Joseph
Kohler, F. G. ..... Minneapolis
Kohler, G. A. ..... Minneapolis
Koller, Herman M. ... Minneapolis
Koller, L. R. ..... Minneapolis
Kolset, Carl D. ..... Benson
Koucky, J. D. ..... Rochester
Kraft, Peter ..... Duluth
Kremer, Walter J. ..... Minneapolis
Kretszchmar, Karl E. Minneapolis
Kriedt, Daniel ..... Minneapolis
Kucera, Wm. J. ..... Minneapolis
Kuhlman, Aug. ..... Melrose
Kusske, A. L. ..... Minneapolis
Kuth, J. R. ..... Duluth
Kvitrud, G. ..... St. Paul
Laird, A. T. ..... Nopeming
Lajoie, John M. ..... Minneapolis
Lampson, H. L. ..... Duluth
Landeen, F. G. ..... Stillwater
Landenberger, John. New Prague
Lane, Laura A. ..... Minneapolis
Laney, R. L. ..... Puposky
Langenderfer, F. V. ..... St. Paul
Langhoff, A. H. ..... Glencoe
Lannin, J. C. ..... Mabel
La Pierre, C. A. ..... Minneapolis
Larsen, C. L. ..... St. Paul
Larson, A. L. ..... Fertile
Larson, E. E. ..... Rochester
Larson, M. L. ..... St. Paul
Larson, O. O. ..... Detroit
Latchford, J. K. ..... Rochester
Laurent, A. A. ..... Minneapolis
La Vake, R. T. ..... Minneapolis
Leahy, Bartholomew ..... St. Paul
Leavenworth, R. O. ..... St. Paul
Leavitt, H. H. ..... Minneapolis
Lebowski, J. A. ..... Minneapolis
Leck, Clifford C. ..... Austin
Le Clerc, J. E. ..... Le Sueur
Lee, H. M. ..... Minneapolis
Lee, J. L. ..... Watertown
Lee, John W. ..... Minneapolis
Lee, W. A. ..... Fergus Falls
Lee, Walter N. ..... Madison
Lee, W. P. ..... Northfield
Leech, C. H. ..... Rochester
Leibold, H. H. ..... Parkers Prairie
Leicht, O. ..... Winona
Leitch, Archibald ..... St. Paul
Leland, John T. ..... Herman
Leland, M. N. ..... Minneapolis
Lemon, W. S. ..... Rochester
Lemstrom, Jarl ..... Minneapolis
Lenont, C. S. ..... Virginia
Leopard, B. A. ..... New Richland
Lepak, F. J. ..... Duluth
Lepak, John A. ..... St. Paul
Lerche, William ..... St. Paul
Leuty, Amos ..... Morris
Lewis, A. J. ..... Henning
Lewis, C. B. ..... St. Cloud
Lewis, E. J. ..... St. Cloud
Lewis, J. B. ..... South St. Paul
Lewis, J. D. ..... Minneapolis
Lewis, W. W. ..... St. Paul
Lexa, F. J. ..... Lonsdale
Libert, John ..... St. Cloud
Lichtenstein, H. ..... Winona
Lick, C. L. ..... St. Paul
Liedloff, A. G. ..... Mankato
Lillie, H. I. ..... Rochester
Lillie, W. I. ..... Rochester
Lima, Ludvig ..... Montevideo
Lind, C. J. ..... Minneapolis
Linde, Herman ..... Cyrus
Lindgren, E. I. ..... Duluth
Lindsay, W. V. ..... Winona
Linton, W. B. ..... Rochester
Lippman, H. S. ..... Minneapolis
List, Walter E. ..... Minneapolis
Litchfield, John T. ..... Minneapolis
Litman, Samuel N. .. Meadowlands
Little, D. W. ..... Appleton
Little, W. J. ..... St. Paul
Litzenberg, J. C. ..... Minneapolis
Lloyd, H. J. ..... Mankato
Locken, O. E. ..... Crookston
Logan, A. H. ..... Rochester
Logan, F. W. ..... Blue Earth
Logefeil, R. C. ..... Minneapolis
Lommen, P. A. ..... Austin
Long, Jesse ..... Minneapolis
Long, W. H. ..... Rochester
Loofbourrow, E. H. .. Keewatin
Loomis, E. A. ..... Minneapolis
Love, Fred A. ..... Carlos
Love, Geo. A. ..... Preston
Lowe, L. M. ..... Glyndon
Lowe, R. C. ..... Fairmont
Lowe, Thos. ..... Pipestone
Ludine, Georgine ..... Rochester
Luedtke, G. H. ..... Fairmont
Lufkin, H. M. ..... St. Paul
Lum, C. E. ..... Duluth
Lundgren, A. C. ..... Minneapolis
Lundholm, A. M. ..... St. Paul
Lyday, R. O. ..... Rochester
Lynam, Frank ..... Duluth
Lynch, M. J. ..... Minneapolis
Lyng, John ..... Minneapolis
Lynn, J. F. ..... Waseca
Lyons, S. C. ..... Rochester
Lysne, Henry ..... Minneapolis
McBroom, D. E. ..... Faribault
McCann, D. F. ..... Bemidji
McCann, G. E. ..... Onamia
McCarthy, Donald ... Minneapolis
McCarthy, W. J. ..... Madelia
McCarthy, W. R. ..... St. Paul
McCartney, James L. Minneapolis
McCarty, P. D. ..... Babitt
McClanahan, J. H. ..... White Bear
McClanahan, T. S. ..... White Bear
McCloud, C. N. ..... St. Paul
McComb, C. F. ..... Duluth
McCoy, J. E. ..... Ivanhoe
McCoy, Mary ..... Duluth
McCrea, James ..... Fulda
McCuen, J. A. ..... Duluth
McDaniel, Orianna ... Minneapolis
McDavitt, Thomas ..... St. Paul
McDermott, T. E. ..... Minneapolis
McDonald, A. L. ..... Duluth
McDougald, D. W. ..... Minneapolis
McDowell, J. P. ..... St. Cloud
McEachran, A. ..... Minneapolis
McFarland, A. H. ..... Minneapolis
McGiffert, E. N. ..... Duluth
McGroarty, J. J. ..... Easton
McGuigan, H. T. ..... Red Wing
McGuire, L. D. ..... Rochester
McHaffie, O. L. ..... Duluth
McHugh, Roderick F. ..... Aitkin
McIntire, H. M. ..... Waseca
McIntyre, E. H. ..... Virginia
McIntyre, Geo. ..... Minneapolis
McIntyre, John A. ..... Owatonna
McKaig, Carle B. ..... Pine Island
McKeon, James ..... St. Paul
McKeon, Owen ..... St. Paul
McKeown, E. G. ..... Pipestone
McKibben, H. E. ..... St. Cloud
McKinlay, C. A. ..... Minneapolis
McKinley, J. C. ..... Minneapolis
McKinney, F. S. ..... Minneapolis
McLaren, Jennette M. ... St. Paul
McLaughlin, E. M. ..... Winona
McLaughlin, Jos. A. .. Minneapolis
McMurtrie, W. B. ..... Marble
McNevin, C. F. ..... St. Paul
McNutt, John R. ..... Two Harbors
McPheeters, H. O. ..... Minneapolis
McVicar, Chas. S. ..... Rochester
MacDonald, A. E. ..... Minneapolis
MacDonald, D. A. ..... Minneapolis
MacDonald, Irving C. . Minneapolis
MacLaren, Archibald ..... St. Paul
Macnie, J. S. ..... Minneapolis
Maertz, W. F. ..... New Prague
Magath, T. B. ..... Rochester
Magie, W. H. ..... Duluth
Magney, F. H. ..... Duluth
Mahle, A. E. ..... Rochester
Mailer, Robert ..... Rochester
Maland, C. O. ..... Minneapolis
Malloy, J. F. ..... Rochester
Maloney, T. J. ..... St. Paul
Manley, J. R. ..... Duluth
Mann, A. T. ..... Minneapolis
Manson, F. M. ..... Worthington
Marcley, W. J. ..... Minneapolis
Marcum, E. H. ..... Bemidji
Mariette, Ernest ..... Hopkins
Mark, D. B. ..... Minneapolis
Marquis, W. J. ..... Rochester
Marsh, F. E. ..... Rochester
Martin, T. R. ..... Duluth
Martineau, J. L. ..... St. Paul
Masson, D. M. ..... Rochester
Masson, J. C. ..... Rochester
Matchan, Glen R. ..... Minneapolis
Mathews, Justus ..... Minneapolis
Mattill, P. M. ..... Oak Terrace
Maxeiner, Stanley R. . Minneapolis
May, C. C. ..... Adrian
May, W. H. ..... Minneapolis
Mayfield, A. L. ..... Rochester
Mayland, M. L. ..... Faribault
Mayo, C. H. ..... Rochester
Mayo, W. J. ..... Rochester
Maytum, C. K. ..... Rochester
Mead, Marion ..... Minneapolis
Mebane, D. C. ..... Rochester
Meckstroth, C. W. ..... Brandon
Meeker, W. R. ..... Rochester
Meierding, Wm. A. ... Springfield
Meighen, J. W. ..... Ulen
Meilicke, W. A. ..... Nicollet
Melby, Benedik. Blooming Prairie
Melson, Oliver C. ..... Rochester
Melzer, G. R. ..... Lyle
Mentzer, S. H. ..... Rochester
Merkert, G. L. ..... Minneapolis
Merrill, J. E. ..... Amboy
Merrill, U. H. ..... Rochester
Merriman, L. L. ..... Duluth
Mesker, G. H. ..... Olivia
Metcalf, F. W. ..... Fulda
Meyer, A. A. ..... Melrose
Meyer, E. L. ..... Minneapolis
Meyer, P. S. ..... Belleplaine
Meyerding, E. A. ..... St. Paul
Meyerding, H. W. ..... Rochester
Michael, J. C. ..... Minneapolis
Michelson, H. E. ..... Minneapolis
Miller, H. A. ..... Waseca
Miller, V. I. ..... Mankato
Miller, W. A. ..... New York Mills
Miller, Walter H. ..... Buhl
Mills, J. W. ..... Winnebago City
Millspaugh, J. G. ..... Little Falls
Miners, Geo. ..... Deer River
Mingo, F. E. ..... Hugo
Mintener, J. W. ..... Minneapolis
Mitchell, Frederick ..... St. Paul
Moersch, F. P. ..... Rochester
Moersch, H. J. ..... Rochester
Moffatt, A. G. ..... Howard Lake
Mogilner, S. N. ..... St. Paul
Moir, Wm. W. ..... Minneapolis
Molander, H. A. ..... St. Paul
Moloney, G. R. ..... Belleplaine
Monahan, J. A. ..... Minneapolis
Monroe, P. B. ..... Soudan
Moore, A. B. ..... Rochester
Moorhead, M. B. ..... Minneapolis

Moran, Robert E.....Rochester
More, C. W.....Eveleth
Morell, W. N.....Verndale
Moren, E.....Minneapolis
Moriarty, Cecile R....Minneapolis
Mork, B. O.....Worthington
Morley, G. A.....Crookston
Morris, E. H.....Austin
Morris, F. J.....Prior Lake
Morris, R. Edwin .....St. Paul
Morrison, A. W.....Minneapolis
Morrissey, F. B.....St. Paul
Morse, H. D.....Rochester
Morse, John .....Minneapolis
Morse, M. P.....Le Roy
Morse, Russell W.....St. Paul
Morse, W. E. H.....Morristown
Morsman, L. H.....Hibbing
Morss, C. R.....Zumbrota
Mortenson, N. G.....St. Paul
Morton, H. McI.....Minneapolis
Moses, Joseph, Jr.....Northfield
Moss, Myer N.....St. Paul
Moynihan, A. F.....Sauk Center
Moynihan, T. J.....St. Paul
Muhme, N. B.....Rochester
Murphy, A. B.....Rochester
Murphy, E. F.....St. Paul
Murphy, F. J.....Minneapolis
Murray, D. D. .....Duluth
Murray, W. R.....Minneapolis
Mussey, R. D.....Rochester
Myers, J. A. .....Minneapolis
Myers, Thos.....St. Paul
Naegeli, Frank.....Fergus Falls
Nagel, G. W.....Rochester
Nannestad, J. R.....Albert Lea
Nannestad, R. F.....Lanesboro
Nass, H. A.....Mabel
Nathanson, M. H.....Minneapolis
Nauth, W. W.....Winona
Neal, J. M.....Minneapolis
Neher, F. H.....St. Paul
Nelson, C. P.....Owatonna
Nelson, E. H.....Chisholm
Nelson, H. E.....Crookston
Nelson, H. S.....Minneapolis
Nelson, L. A.....St. Paul
Nelson, M. O.....Rochester
Nelson, M. S.....Spring Grove
Nelson, Nesmuth.....Brainerd
Nelson, O. E.....Minneapolis
Nelson, O. N.....Battle Lake
Nesbit, Harold T.....Rochester
Neumann, C. A.....Lewiston
New, G. B.....Rochester
Newhart, Horace.....Minneapolis
Newman, G. A.....Stillwater
Nichols, A. E.....St. Paul
Nicholson, J.....Brainerd
Nicholson, M. A.....Duluth
Nippert, H. T.....St. Paul
Nippert, L. A.....Minneapolis
Nixon, S. H.....Rochester
Noonan, Dan F.....Minneapolis
Nootnagel, C. F.....Minneapolis
Noran, A. H.....Minneapolis
Nordin, C. G.....Brainerd
Nordin, G. T.....Minneapolis
Nordland, Martin.....Minneapolis
Norman, J. F.....Crookston
Norrgard, H. T.....Milaca
Norris, Edgar H.....St. Paul
Norris, G. H.....Annandale
Novak, E. E.....New Prague
Nusbaum, D. H...Storm Lake, Ia.
Nye, Katherine.....St. Paul
Nye, Lillian L.....St. Paul
O'Brien, H. J.....St. Paul
O'Connor, D. C.....Eden Valley
O'Connor, J. P.....St. Paul
O'Connor, J. V.....St. Paul
O'Connor, Patrick H.....Amboy
O'Donnell, D. M.....Ortonville
O'Donnell, J. E.....Minneapolis
O'Hara, J. J.....Janesville
O'Leary, P. A.....Rochester
Oberg, C. M.....Minneapolis
Odegaard, B. C.....Emmons
Odland, Henry.....Minneapolis
Oerting, Harry .....St. Paul
Offutt, Susan R.....Rochester
Ogden, Warner.....St. Paul
Ohage, Justus.....St. Paul
Ohage, Justus, Jr.....St. Paul
Ohlinger, L. B.....Rochester
Ohnstad, J.....McIntosh
Oliver, C. I.....Graceville
Olson, Albert E.....Duluth
Olson, Chas. A.....St. Paul
Olson, F. A.....Minneapolis
Olson, G. M.....Minneapolis
Olson, Olaf A.....Minneapolis
Olson, O. S.....Duluth
Olson, R. G.....Minneapolis
Olson, W. P.....Gaylord
Onsgard, C. K.....Halstad
Onsgard, L. K.....Houston
Opheim, O. V.....Starbuck
Oppegaard, M. O.....Crookston
Oredson, O. A.....Duluth
Osborn, Lida.....Mankota
Ostergren, E. W.....St. Paul
Otto, H. C.....Frazer
Owre, Oscar.....Minneapolis
Pake, S. G.....Duluth
Palmer, C. F.....Albert Lea
Palmer, W. L.....Albert Lea
Paradine, J.....Duluth
Pardee, K.....Moorhead
Pare, L. T.....Duluth
Parker, B. R.....Rochester
Parker, H. L.....Rochester
Parker, J. Willam.....Rochester
Parker, O. W.....Ely
Parks, A. H. .....Minneapolis
Parrott, B. W.....Long Prairie
Parson, L. R.....Elbow Lake
Passer, A. A.....Olivia
Patterson, C. H.....Barnesville
Patterson, W. E.....Minneapolis
Patterson, W. E.....Westbrook
Patterson, W. L....Fergus Falls
Paulsen, E. L.....Minneapolis
Paulson, C. W.....North Branch
Paulson, G. A.....Duluth
Paulson, T. S.....Fergus Falls
Payette, C. H.....Duluth
Pearce, N. O.....Minneapolis
Pearson, F. R.....St. Paul
Pederson, A. H.....St. Paul
Pederson, Harold....Minneapolis
Pederson, O. J.....Hanska
Pederson, R. M.....Minneapolis
Pemberton, J. deJ.....Rochester
Pengelly, E. J.....Ironton
Penhall, F. W.....Morton
Pennie, D. F.....Duluth
Peppard, T. A.....Minneapolis
Perley, A E.....Chisholm
Perry, C. G.....St. Paul
Perry, R. St. J.....Minneapolis
Persons, C. E.....Marshall
Peterman, M. G.....Rochester
Peters, R. M.....Minneapolis
Petersen, J. R.....Minneapolis
Peterson, A. A.....Mora
Peterson, Alfred .....Dassel
Peterson, Christian ....Owatonna
Peterson, H. E.....Granite Falls
Peterson, O. H.....Minneapolis
Peterson, O. L.....Cokato
Peterson, R. A.....Vesta
Peterson, Thorvald ..Minneapolis
Peterson, V. N.....St. Paul
Peterson, Willard C..Minneapolis
Pettit, C. W.....Minneapolis
Peyton, Wm. T.....Minneapolis
Pfaff, E. K.....Los Angeles, Calif.
Phelps, Kenneth.....Minneapolis
Phelps, R. M.....St. Peter
Phillips, A. E.....Delano
Phillips, W. H.....Jordan
Pierce, Chas. H.....Wadena
Pierson, Claude M.....Wheaton
Pilon, P. C.....Paynesville
Pine, Auten A.....St. Paul
Pineo, W. B.....Minneapolis
Piper, M. C.....Rochester
Piper, Wm. A.....Mountain Lake
Plankers, A. G.....Rochester
Platt, J. J.....St. Paul
Plondke, F. J.....St. Paul
Plonske, C. J.....Faribault
Plummer, H. S.....Rochester
Plummer, W. A.....Rochester
Poehler, F. T.....Minneapolis
Poirier, J. A.....Forest Lake
Pollock, L. W. .....Minneapolis
Poppe, Fred H.....Minneapolis
Portman, W. C.....Jackson
Potter, J. C.....Rochester
Powell, L. D.....Rochester
Power, J. E.....Duluth
Powers, F. W.....Barrett
Prangen, A. D.....Rochester
Pratt, C. C.....Mankato
Pratt, Fred J.....Minneapolis
Pratt, J. A.....Minneapolis
Preine, I. A.....Minneapolis
Prendergast, H.....Brainerd
Prim, J. A.....Minneapolis
Pritchard, D. B.....Winona
Proctor, O. S.....Rochester
Proshek, Charles E...Minneapolis
Puffer, F. L.....Bird Island
Pulford, D. S., Jr.....Rochester
Putney, G. E.....Paynesville
Quigley, T. C.....Owatonna
Quinby, Thomas F....Minneapolis
Quist, H. W.....Minneapolis
Raadquist, C. S.....Hibbing
Radabaugh, R. C.....Hastings
Radtke, H. P.....Chisholm
Raihala, John .....Virginia
Rains, J. M.....Willmar
Raiter, F. W. S.....Cloquet
Raiter, Roy F.....Cloquet
Ramsey, W. R.....St. Paul
Randall, B. M.....Graceville
Ransom, L. M.....Hancock
Ratcliffe, J. J.....Aitkin
Rathbun, A. M.....Rice
Rathbun, C. A.....St. Cloud
Ravu, Bjarne.....Minneapolis
Reed, Chas. A.....Minneapolis
Rees, S. P.....Minneapolis
Reeve, E. T.....Elbow Lake
Regnier, E. A.....Minneapolis
Reid, J. S.....Rochester
Reinke, George F.....New Ulm
Reinertson, B. R....Buffalo, S. D.
Reiter, H. W.....Shakopee
Replogle, W. H.....Wabasha
Reynolds, Hugh.....Hibbing
Reynolds, J. S.....Minneapolis
Rhines, D. C.....Caledonia
Rice, G. D.....St. Cloud
Richards, E. T. F.....St. Paul
Richardson, F. S.....Belegrade
Richardson, Harold E.....St. Paul
Richardson, W. E.....Pipestone
Richardson, W. J.....Fairmont
Richdorf, L. F.....Minneapolis
Richmond, Chas. D.....Jeffers
Richter, E. H.....Hunter, N. D.
Ridgeway, Alexander....Belgrade
Ridgway, A. M.....Annandale
Riggs, C. E.....St. Paul
Rippert, J. A.....Duluth
Rishmiller, J. H.....Minneapolis
Risser, E. D.....Winona
Ritchie, H. P.....St. Paul
Rivers, A. B.....Rochester
Rizer, R. I.....Minneapolis
Roadman, I. M.....Ponsford
Roan, Carl M.....Minneapolis
Robb, Edw. F.....Minneapolis
Robbins, C. P.....Winona
Roberts, L. M.....Little Falls
Roberts, Thos. S. .....Minneapolis
Roberts, W. B.....Minneapolis
Robertson, A. W.....Litchfield
Robertson, H. E.....Rochester
Robertson, J. B.....Cottonwood
Robertson, W. P.....Litchfield
Robilliard, C. M.....Faribault
Robilliard, W. H.....Faribault
Robinson, J. M.....Duluth
Robitshek, E. C.....Minneapolis
Rochford, W. E. .....Minneapolis
Rockwood, P. R.....Rochester
Rodda, F. C.....Minneapolis
Rodgers, C. L.....Minneapolis
Roehlke, A. B.....Elk River
Rogers, John T. .....St. Paul
Roholt, C. L.....Waverly
Rohwer, C. J.....Rochester
Rood, D. C.....Hibbing
Rose, J. T.....Lakefield
Rosen, S.....Minneapolis
Rosenberry, B. P.....Winona
Rosenow, E. C.....Rochester
Rosenwald, R. M.....Minneapolis
Rothenberg, J. C.....Springfield
Rothrock, J. L.....St. Paul
Rothschild, H. J.....St. Paul
Rousseau, Victor.....Maple Lake
Rowe, O. W.....Duluth
Rowe, Paul H.....Minneapolis
Rowntree, L. A.....Rochester
Roy, J. A.....Red Lake Falls
Roy, Philemon.....St. Paul
Rudie, P. S.....Duluth
Ruhberg, Geo. N.....St. Paul
Rumpf, C. W.....Faribault
Rumpf, W. H.....Faribault
Russell, H. R.....St. Paul
Rutherford, W. C.....St. Paul
Rutledge, L. H.....Detroit
Ryan, John J.....St. Paul
Ryan, J. W.....Duluth
St. Clair, G. G.....Duluth

Saar, W. G.....Hutchinson
Sanderson, A. G.....Granite Falls
Sanderson, E. T.....Minneota
Sanford, A. H.....Rochester
Sargeant, H. L.....Rochester
Satersmoen, Theo..Pelican Rapids
Sather, E. R.....Alexandria
Satterlund, Victor.....St. Paul
Savage, F. J.....St. Paul
Sawatzky, Wm. A.....Minneapolis
Sawyer, H. P.....Red Wing
Schaaf, F. H. K.....Minneapolis
Schaefer, S.....Winona
Schatz, F. J.....St. Cloud
Schefcik, J. F.....Minneapolis
Scheldrup, N. H.....Minneapolis
Scherer, C. A.....Duluth
Schiesselman G....Good Thunder
Schiesselman, J. T.....Mankato
Schlutz, Fred W.....Minneapolis
Schmidt, G. F.....Minneapolis
Schmidt, P. A.....Mapleton
Schmidt, W. R.....Glencoe
Schmitt, A. F.....Minneapolis
Schmitt, E. O. G.....Rochester
Schmitt, S. C.....Minneapolis
Schneider, C. L.....Deer Creek
Schneider, H. A.....Jordan
Schneider, J. P.....Minneapolis
Schoch, J. L.....New Ulm
Schoch, R. B.....St. Paul
Scholl, A. J.....Rochester
Scholpp, O. W.....Hutchinson
Schons, E.....St. Paul
Schottler, G. J.....Dexter
Schroeder, C. H.....Duluth
Schuldt, F. C.....St. Paul
Schultz, J. A.....Albert Lea
Schulze, Albert G.....St. Paul
Schussler, Otto F.....Minneapolis
Schwartz, A. H.....Duluth
Schwyzer, Arnold.....St. Paul
Schwyzer, Gustav....Minneapolis
Scofield, C. L.....Benson
Scott, J. W.....St. Charles
Seaberg, J. A.....Minneapolis
Seashore, D. E.....Duluth
Seashore, Gilbert ....Minneapolis
Seed, Lindon.....Rochester
Seham, Max.....Minneapolis
Seifert, Otto J.....New Ulm
Senkler, G. E.....St. Paul
Senn, E. W.....Owatonna
Shaffer, Loren W.....Rochester
Shalleen, A. W.....Hallock
Shannon, S. S.....Crosby
Shannon, W. Ray.....St. Paul
Shapere, A. D.....St. Paul
Shapiro, E. Z.....Duluth
Shaw, A. W.....Buhl
Shedlov, A.....Gully
Sheldon, W. D.....Rochester
Shelland, J. T.....Ada
Shellman, John L.....St. Paul
Shelver, H. J.....Ortonville
Sheppard, Fred.....Hutchinson
Sheppard, P. E.....Hutchinson
Sherman, C. H.....Bayport
Sherman, C. L.....Luverne
Sherman, H. T.....Franklin
Sherping, O. Th.....Fergus Falls
Sherwood, G. E.....Kimball
Shillington, M. A.....St. Paul
Shimonek, Anton.....St. Paul
Shipley, H. M.....Adams
Shrader, E. E.....Watertown
Shrader, J. S.....Springfield
Shulean, Nellie S.....Cambridge
Simison, C. W.....Hawley
Simon, B. F.....St. Paul
Simon, Geo. H.....St. Paul
Simons, Jalmar .....Minneapolis
Simpson, E. D.....Minneapolis
Simpson, J. D.....Minneapolis
Sistrunk, W. E.....Rochester
Sivertsen, Andrew ...Minneapolis
Sivertsen, Ivar .....Minneapolis
Skinner, H. O.....St. Paul
Slater, S. A.....Worthington
Slocumb, J. A.....Plainview
Slocumb, Maude S....Minneapolis
Slyfield, F. F.....Duluth
Smallwood, J. T.....Worthington
Smersh, F. M.....Owatonna
Smersh, J. F.....Owatonna
Smith, A. M.....Minneapolis
Smith, Arthur E....Minneapolis
Smith, B. A.....Crosby
Smith, B. F.....St. Peter
Smith, C. M.....Duluth
Smith, E. H.....Bemidji
Smith, F. D.....Kasson
Smith, F. L.....Rochester
Smith, Homer R.....Minneapolis
Smith, L. G.....Montevideo
Smith, M. W.....Red Wing
Smith, Norman M....Minneapolis
Smith, P. A.....Faribault
Smith, Wm. H.....Cass Lake
Snell, Albert M.....Rochester
Snyder, G. W.....St. Paul
Soderlind, A. .....Minneapolis
Sogge, L. .....Windom
Sohlberg, Olof .....St. Paul
Sohmer, A. E.....Mankato
Souba, Fred J.....Minneapolis
Spicer, F. W.....Duluth
Sprafka, J. M.....St. Paul
Spratt, C. N.....Minneapolis
Sprunt, William H.....Rochester
Spurbeck, R. G.....Cloquet
Spurzem, R. J.....Anoka
Stacy, L. J.....Rochester
Staley, J. C.....St. Paul
Stangl, Fred .....St. Cloud
Stangl, P. E.....St. Cloud
Stanley, C. R.....Worthington
Staples, H. L.....Minneapolis
Stark, W. B.....Rochester
Steen, A. H.....Cottage Grove
Steffens, L. A.....Red Wing
Steiner, I. W.....Winona
Stemsrud, A. A.....Dawson
Sterner, E. G.....St. Paul
Sterner, O. W.....St. Paul
Steven, Geo. .....Byron
Stevens, F. A.....Lake Elmo
Stevens, J. B.....Rochester
Stewart, A. B.....Owatonna
Stewart, Alexander .....St. Paul
Stewart, C. A.....Minneapolis
Stewart, O. E.....Bemidji
Stierle, Adolph, Jr.....St. Paul
Stinnette, S. E.....St. Paul
Stinson, J. W.....Rochester
Stocking, F. F.....Milaca
Stokes, J. H.....Rochester
Stolpestad, H. L.....St. Paul
Stomel, Joseph .....Minneapolis
Stowe, A. J.....Rush City
Strachauer, A. C.....Minneapolis
Strathern, F. P.....St. Peter
Strathern, M. L.....Gilbert
Strickler, A. F.....Sleepy Eye
Strickler, Mary .....Sleepy Eye
Strickler, O. C.....New Ulm
Strobel, W. G.....Duluth
Strout, E. S.....Minneapolis
Strout, G. Elmer.....Minneapolis
Stuart, A. B.....Cloquet
Stuhr, J. W.....Stillwater
Sturges, C. J.....Buffalo
Sturre, J. R.....Watkins
Sukeforth, L. A.....Duluth
Sundt, M. .....Minneapolis
Sutherland, C. G.....Rochester
Sutherland, H. N.....Ely
Sutton, Chas. S.....St. Cloud
Sutton, L. F.....Mazeppa
Swan, Theo. S.....Rochester
Swanson, E. O.....St. Paul
Swanson, Roy E.....Minneapolis
Swartwood, F. A.....Waseca
Sweeney, Arthur .....St. Paul
Swendson, J. J.....St. Paul
Sweatman, R. H.....Sauk Center
Sweetser, H. B.....Minneapolis
Sweetser, Theodore ..Minneapolis
Sweitzer, S. E.....Minneapolis
Swennes, O. S.....Wahkon
Swenson, Charles .....Braham
Sybilrud, H. W.....Bricelyn
Taft, John O.....Minneapolis
Taft, Walter L.....Minneapolis
Tanner, A. C.....Minneapolis
Taylor, A. C.....Duluth
Taylor, C. W.....Duluth
Taylor, H. L.....St. Paul
Taylor, Rood .....Minneapolis
Taylor, R. V.....Rochester
Taylor, Wm. J.....Pipestone
Teisberg, C. B.....St. Paul
Tennyson, Theo. .....Minneapolis
Ternstrom, O. H.....Minneapolis
Thabes, J. A.....Brainerd
Thauwald, C. C.....St. Paul
Theissen, W. N.....Faribault
Thomas, D. O.....Minneapolis
Thomas, Geo. E.....Minneapolis
Thomas, Geo. H.....Minneapolis
Thomas, Gilbert J....Minneapolis
Thompson, Albert .....St. James
Thompson, H. H.....Minneapolis
Thompson, V. C.
Marine-on-St. Croix
Thordarson, Theo. .....Minneota
Thoreson, Th. ....Brooklyn, N. Y.
Thornby, H. J.....Moorhead
Thorson, E. O.....Luverne
Thysell, F. A.....Moorhead
Tibbetts, M. H.....Duluth
Tiber, L. J.....St. Paul
Tiedeman, E. J.....Adrian
Tiedeman, I. D.....Heron Lake
Tierney, C. M.....Granger
Tilderquist, D. L.....Duluth
Tilton, Albert J.....Alden
Tingdale, A. C.....Minneapolis
Tofte, Josephine ....Minneapolis
Torkelson, P. T.....Lyle
Towers, F. E.....Minneapolis
Traeger, C. A.....Faribault
Trutna, Thos. J.....Silver Lake
Tuohy, E. L.....Duluth
Turnacliff, D. D.....Minneapolis
Turnbull, F. M.....Duluth
Tweedy, G. .....Winona
Tyrrell, C. C.....Minneapolis
Ulrich, Henry L.....Minneapolis
Undine, A. Clyde.....Minneapolis
Urberg, S. E.....Duluth
Utley, J. O.....Glendale, Calif.
Vadheim, A. L.....Tyler
Vail, J. B.....New York Mills
Valentine, W. H.....Tracy
Van de Steeg, Wm. G....Biwabik
Van Norman, K. H.....St. Paul
Van Slyke, Chas. A.....St. Paul
Van Valkenburg, B. F.
Long Prairie
Vercellini, C. E.....Duluth
Vigen, J. G.....Fergus Falls
Vinson, P. P.....Rochester
Vogel, Jos. H.....New Ulm
Vogtel, Melvin A....Minneapolis
Vollum, E. O.....Albert Lea
Von Berg, J. P.....Albert Lea
Von der Weyer, Wm.....St. Paul
Von Lackum, W. H....Rochester
Voyer, Emile O.....Minneapolis
Vrooman, F. E.....St. Francis
Waas, Chas. Wm.....St. Paul
Wagener, H. P.....Rochester
Wahle, G. H.....Rochester
Wald, R. H.....St. Paul
Waldie, Geo. McL.....Wabasha
Walker, A. E.....Duluth
Walker, C. C.....Raymond
Walker, R. E.....St. Paul
Waller, Jas. D.....Wilmont
Wallinga, John H.....St. Paul
Walters, B. Frank.....St. Paul
Walters, Franklin R..Moose Lake
Walters, H. W.....Rochester
Wangensteen, O. H....Rochester
Wanous, E. Z.....Minneapolis
Ward, A. W.....Minneapolis
Ward, Percy A.....Minneapolis
Warham, T. T.....Minneapolis
Warner, E. F.....St. Paul
Warnock, R. W.....St. Paul
Warren, C. L.....Le Roy
Warren, E. L.....St. Paul
Warren, F. S.....Faribault
Warren, J. W.....Faribault
Warwick, Margaret .....St. Paul
Watson, A. M.....Royalton
Watson, C. W.....Minneapolis
Watson, F. G.....Worthington
Watson, J. A.....Minneapolis
Watson, John D.....Holdingford
Watson, N. M.....Red Lake Falls
Watson, Tolbert .....Albany
Wattam, G. S.....Warren
Way, O. F.....Claremont
Webb, R. C.....Minneapolis
Webber, Edward E.....Proctor
Webber, I. M.....Rochester
Weber, M. L.....Duluth
Webster, H. E.....Duluth
Weeks, L. C.....Detroit
Weir, J. D.....Beardsley
Weir, J. F.....Rochester
Weirick, Howard R.....Hibbing
Weiser, F. R.....Windom
Weiser, Geo.....New Ulm
Weisman, S. A.....Minneapolis
Welch, M. C.....St. Paul
Wellcome, J. W. B....Sleepy Eye
Welles, H. J.....Minneapolis
Wentworth, A. J.....Mankato
Werner, N. L.....Red Wing
Werner, O. S.....St. Hilaire

Westby, Nels .....Madison
Weston, C. G.....Minneapolis
Wethall, A. G.....Minneapolis
Weum, T. W.....Minneapolis
Wheeler, M. W.....St. Paul
Whetstone, Mary ....Minneapolis
Whitacre, J. C.....St. Paul
Whitcomb, Ed. H.....St. Paul
White, J. S.....St. Paul
White, S. Marx.....Minneapolis
White, W. D.....Minneapolis
Whitmore, F. W.....St. Paul
Whitney, A. W.....St. Paul
Widen, W. F.....Minneapolis
Wilcox, Archa E.....Minneapolis
Wilcox, F. L.....Walker
Wilcox, M. Russell...Minneapolis
Wilder, R. M.....Rochester
Wilhelm, L. F. X.....Rochester
Wilkins, J. A.....Rochester
Wilkinson, Stella .....Duluth
Will, W. W.....Bertha
Willcut, Clarence ....Minneapolis
Williams, Clayton .....St. Paul
Williams, Hugh O...Lake Crystal
Williams, John .....Lake Crystal
Williams, L. A.....Slayton
Williams, Robert ....Minneapolis
Williams. R. J.....Pine River
Williams, R. V.....Rushford
Williamson, Carl S.....Rochester
Willius, F. A.....Rochester
Willson, Hugh S.....Minneapolis
Wilson, C. E.....Blue Earth
Wilson, L. B.....Rochester
Wilson, Warren .....Northfield
Wilson, W. F.....Lake City
Wiltrout, I. G.....Oslo
Winberg, O. K.....Lake Park
Winnick, J. R.....St. Paul
Winter, J. A.....Duluth
Wiseman, R. L.....Pine City
Witherstine, H. H.....Rochester
Withrow, M. E.International Falls
Wittich, F. W.....Minneapolis
Wohlrabe, A. A.....Minneapolis
Wold, K. C.....St. Paul
Wolner, Oscar H.....Gilbert
Woltman, H. W.....Rochester
Wood, Douglas F....Minneapolis
Wood, H. G.....St. Paul
Woodard, F. R.....Minneapolis
Woodruff, C. W.....Chatfield
Woodworth, Elizabeth
Minneapolis
Woodworth, L. F.Le Sueur Center
Woolway, C. J.....Deerw
Workman, H. M.....Tra
Workman, W. G.....Trac
Wray, W. E.....Campbe
Wright, C. B.....Minneapoli
Wright, C. Darcy....Minneapoli
Wright, C. O.....Luverne
Wright, Franklin R..Minneapoli
Wynne, H. M. N.....Minneapoli
Ylvisaker, L. S.....St. Pau
Yoakem, H. H.....Rochest
Yoerg, C. M.....Minneap
Young, Thos. Otto.....D
Young, V. A.....I
Zander, C. H.....St. P
Zaworske, E. A.....Minneapoli
Zeien, Thos. .....North Branch
Zierold, A. A.....Minneapoli
Zimbeck, R. D.....Maynard
Zimmerman, H. B.....St. Pau
Ziskin, Thomas .....Minneapoli

Honorary Members

Beard, R. O.....Minneapoli
Chesley, A. J.....Minneapoli
Erdmann, C. A.....Minneapoli
Jackson, C. M.....Minneapoli